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-PENYATA PENDAPATAN-

By

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2000/2001

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Abstract

This project report is to provide an overview and technical report of what I did in my thesis. The main objective of this project is to develop an EasyAccount package including accounting learning package, administration system and automatic accounting system which is suitable for secondary school especially for the SPM account students and teachers.

Nowadays, it is essential for the students and teachers to have a computerized system to assist them in the learning and teaching work. The system will enhance the quality of work and reduce the paper use in whole of the processes. EasyAccount system includes the following three major parts: Accounting Learning Section, Automatic Accounting System and System Administrator Section. In addition, this system is developed using Visual Basic as a powerful tool for developing tool.

EasyAccount system is a Windows-based program that allows the students and teachers to computerized the whole accounting system. The relational behind its development is to meet the rapidly increasing demand for information retrieval, which makes possible the accounting system more efficiently and effectiveness.

The prototyping approach was selected for the developing process because the methodology was applied throughput the develop phases of system analysis, design, coding and testing. Visual Basic as Object Oriented Programming Language (OOPL) was selected as main developing tool. Understanding and use the correct software and tools were essential to develop a good working system.

Maintenance system is needed for administrator to select Exercises and Pass Year Question frequently for students. Finally, it can be concluded that a success student or teacher is always supported by the computer-based system. Hence, EastAccount system is an excellent tool for them.

Acknowledgement

Developing and communication project had been a very great challenge to me. Throughout the duration of the project development, many people had been very kind in lending helping hands, giving invaluable advice and encouragement.

I would like to take this opportunity to express my gratitude thanks to my respected supervisor, Puan Norizan Mohd. Yasin, especially thanks for her guidance and supervision throughout the project.

Special thanks also to Mr. Yau Kok Wood in sharing his experiences; Leaw Chai Sze and Wong Ai Yieng and other discussion group members in sharing thoughts and knowledge; lecturers and all staffs in FSKTM.

Last, but not least, I wish to thank my beloved family and friends who have been considerate and supportive during the project.

CHAPTER 1
INTRODUCTION

Chapter 1 Introduction

This project is to create a accounting learning package, EasyAccount is the name of this package. EasyAccount is consists of three main sections, that is Accounting Learning Section, Automatic Accounting Section and System Administrator Section.

In this introduction of project is described the needs for the system and placed the system in context, briefly describing its functions and presenting a rationale for the software system. [2]

1.1 Project Definition

- The nature of the current problem

We can notice that lacking of accounting learning tools package for secondary school especially for SPM student. Mostly in the market, accounting packages are application that basically describing the usage of the accounting system. There have many accounting packages commonly and widely used by organizations and institutes in Malaysia such as UBS Computerize Accounting version, M. Y. O. B. Accounting, AccPac Smart_Simply_Acc and AccPro Account.

- The things are done in traditionally and manually

Traditionally, students are learning recommended accounting texts book and attending lesson class chapter by chapter teaching by teacher. They are doing their exercise and test manually, and sometimes having group discussion orally. Normally, students are boring with the traditional learning way which is all the subjects are teaching in class for whole year.

- Weaknesses and drawbacks of the traditional approach

In this traditional education style, not every student is interesting and they may fail to concentrate on learning accounting. Some students may not catch up the lesson. If not to improve in this case, they will fail to finish exercise by themselves on time. When take part in a group discussion, they may not fell willing or scared to speak up in front of friends and teacher. Teacher may not effort to keep an eye on each student while teaching and giving lesson in class. Student also didn't get and manage time to ask question when they facing problem at home later.

As conclusion, some learning alternatives as well as this multimedia learning tools for future expansion are considered.

- Elaboration of project

I am assigned in this comprehensive project that requires a broad range of decisions to develop a major part of the new system. Here the project is proposed to give a new and creative accounting learning package. An interactive multimedia Accounting Learning Section which is a tool including the lesson, exercise, note and pass year question. Multimedia gives more attractive and interesting learning for concentration. A step-by-step animated and voice description lesson especially on the preparation of journal to balance sheet gives a special feature in this learning package.

At the end of the learning part, user will be given by a simple exercise to test out the understanding of user. User is encouraged to try the pass year question and forecast question which are given by completed answer. When the user meets problem during pass year question testing, the given roles as a guide direction for user to find out and solute problem individually in anytime.

An Automatic Accounting System enables user to key in record data without double recording process and generating an accurate and precise account report such as Journal, Ledger, Trial Balance, Income Statement and Balance Sheet. A System Administrator Section is designed for teacher to update and maintenance the Accounting Learning Section accurately.

1.2 Project Objective

Many accounting information courses include a system's project in which students design a system for either a real or an imaginary organization currently.

The new software created attends to provide an accounting learning package. This system has set up several objects as stated as below:

1. *Provide easy learning tools to the user.*

The objective of the project is to provide learning about income statement which easy learning tools for example bookkeeping and accounting concept to the user to learn the accounting system. This package is especially designed for SPM accounting student and teacher.

2. *Provide a multimedia interactive and useful learning tools for the user.*

   The learning tools for user is created to provide a multimedia interactive and useful learning tools. An interactive multimedia can bring out the objective of the learning tools clearly and enhance the effectiveness and efficiency of information propagation in the accounting studies.

3. *Reduce redundancy process by create an automatic posting.*

   After studied on some accounting software, normally the application of the software in the market have do the redundancy process that is user have to repeat to enter some data. It is reduced by creates a function that giving an automatic posting of data into some various account, data in the trial balance can be posted to finance statement and then posting to balance sheet automatically too.

4. *To reduce the double recording process.*

   With the growing age of information technology, various kind of work, activities, transaction and process etc has been converted from the manual system to the computerize system. Typically, journal and ledger are recorded one by one manually before the trial balance, finance statement and balance sheet are created. In this package, user need to enter data into computer once only, the double recording process can be reduced by the way. All transaction on-line can have back up by using media storage such as diskette or print out the record.

5. *To come up with an account package to improvise the features of the accounting software available in the market currently.*

   Besides that, an idea to create a better and modified account package was come up to improvise the features of the accounting software available in the market currently. This accounting software package is created and modified majority based on UBS accounting

package as a reference model. The accounting software is being developed to help us develop excellent report and statement in our financial control.

1.3 Project Scope

This system is developed to provide the following functions:

1. Create learning tools for accounting especially in preparation journal to balance sheet.
2. Develop a database system that used to store all the records to system.
3. Organize all records pertaining to the system.
4. Create an interactive user guide for SPM standard accounting study.
5. To develop a system administrator section.
6. Additional features provided with exercise and note in learning tool.

1.4 Fact Finding

Fact finding refers to the method of gathering information regarding a system. It is necessary to employ fact finding in order to establish understanding of the state and future requirement on the system study and provide the groundwork for the system design.

The following method are used to gather information for the new system:

- Books and references

Books and references are used to get the information that needed to develop the system. This includes information from programming language references in library and pass year thesis in document room.

- Internet surfing

The Internet is the largest information warehouse in the world. As such, it is used to get information on accounting software, programming language and technologies.

1.5 Project Development Methodology

The methodology in this project is chosen using the Prototyping after the comparison from the others type such as waterfall, Computer-Aided Software Engineering (CASE) tools and Rapid Application Development (RAD).

Prototype is an original or model after which anything is formed, or is the first thing or being of its kind, or is a pattern, an exemplar or architecture. Prototypes are a first attempt at a design that generally is later extended and enhanced.

Software prototype a live, working system, not just an idea on paper, can be evaluate by the designer and/or the eventual end users through its use in an operational mode. It performs actual work, by simulate work. Test out assumptions about the design of the application or logic of programming.

Prototype is created quickly, relatively inexpensive to build because the language creates much of the code with end user tools, people can get prototypes up and running quickly. Prototype is an iterative process begins with simple prototype that performs only a few of the basic functions discover new requirements and refinement to incorporate in each succeeding version. Each version performs more of the desired functions in an increasingly efficient manner.

The development strategy for this project is based on software prototype model. Prototype methodology is a better strategy due to the lack of knowledge of client/server programming technique at the beginning. Prototype is a process that enables the developed rapidly so that the user may access result and recommend changes. The prototyping model like all approaches in software development, prototyping begins with requirements gathering. After identifying all the known requirements, a quick design is carried out, which focuses on the top-level architecture and data design issues of those aspects of the system that is visible to the user, other than on detailed procedural design. The quick design leads to the construction of a prototype has evolved into a production system. The prototype is tested and evaluated to refine the requirements. A process of iteration occurs until all the requirements are formalized or until the prototype has evolved into a production system.

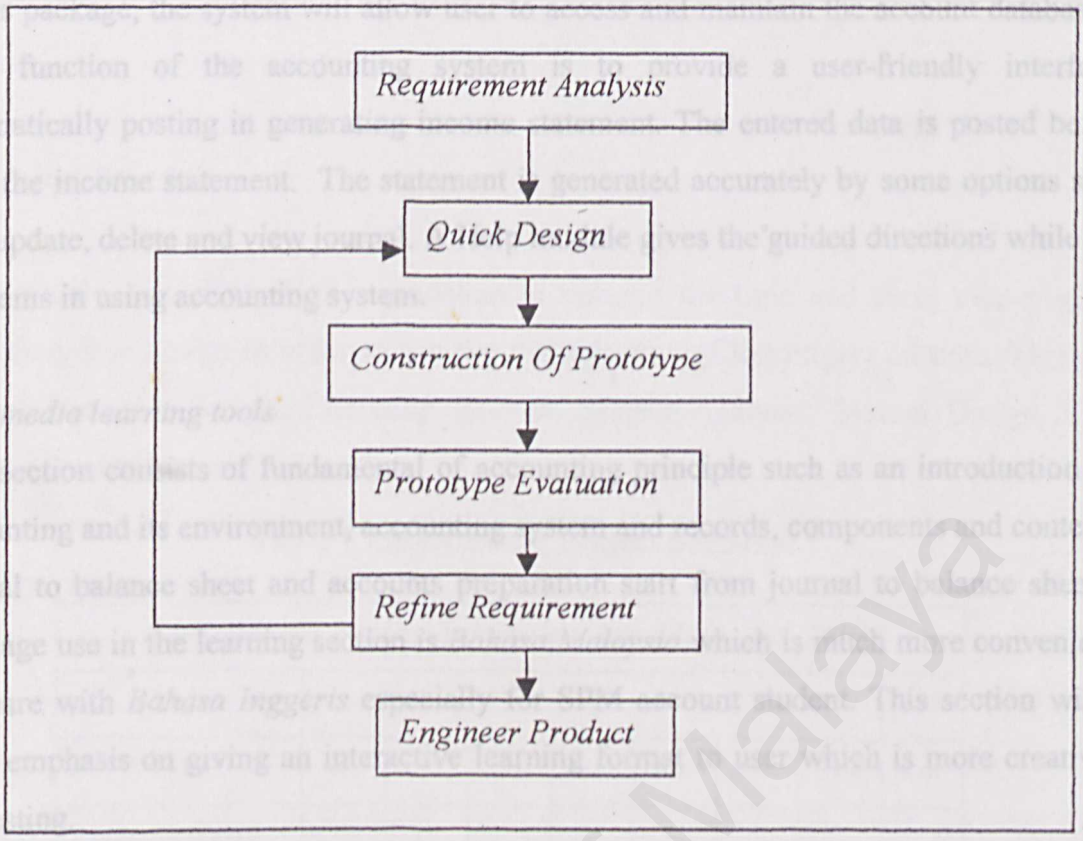

Figure 1 Prototype Model

The prototyping model was used mainly because it supports Rapid Development (RAD), helps to formalize requirements and provides a prototype for the users to test, feel and experiment, but not on system efficiency or completeness.

1.6 Project Outcome

As suggested, the result of the project will be a multimedia learning tools whereby the user as a student can learn use in the accounting system or as a teacher can select the exercises and pass year question from the administrator. It is completed together with an accounting learning package, namely EasyAccount.

The functions or modules expected from this project are listed as below:

a) Accounting system background/features

In this package, the system will allow user to access and maintain the account database. The main function of the accounting system is to provide a user-friendly interface to automatically posting in generating income statement. The entered data is posted before to view the income statement. The statement is generated accurately by some options such as add, update, delete and view journal. A Help module gives the guided directions while facing problems in using accounting system.

b) *Multimedia learning tools*

This section consists of fundamental of accounting principle such as an introduction to the accounting and its environment, accounting system and records, components and contexts for journal to balance sheet and accounts preparation start from journal to balance sheet. The language use in the learning section is *Bahasa Malaysia* which is much more convenience if compare with *Bahasa Inggeris* especially for SPM account student. This section will give more emphasis on giving an interactive learning format to user which is more creative and interesting.

c) *Additional features of learning package*

Exercise module and quiz module in this package will be given to user as an exercise to test out the totally understanding of user. From the additional features, user will learn how to generate income statement from trial and error and the quiz module will be given by corrected and completed answer.

d) *Administration features for system*

In this section, teacher as an administrator have to login before maintenance work. The maintenance works for teacher are select, add, edit and delete in the exercise and quiz module.

e) *Output*

The generated completed in standard format of journal to balance sheet screen output can be print-preview by click a button and user also can print out the completed copy for backup.

The exercise and quiz part of the accounting lesson also can be print out for teacher and student.

1.7 Project Schedule

Project schedule was planned as a guideline to manage the time and tasks that need to be accomplished. It is design in order to achieve the objective of the project on time. This project consists of Literature Search, Literature Review, System Analysis, System Design, Coding, Testing and Documentation.

Table 1 EasyAccount Project Schedule

EasyAccount Project Schedule (Jun 2000 - Jan 2001)								
Year	2000							2001
Activity	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Literature Search								
Literature Review								
System Analysis								
System Design								
Coding								
Testing								
Documentation								

1.8 Report Layout

The purpose of this layout is to give an overview of the major phases involved during the development of the project. Below is the report layout:

Chapter 1 : Introduction

The chapter gives an overview of project that includes the definition, objective, project scope, fact finding, project development methodology and project schedule.

Chapter 2 : Literature Review

The chapter gives brief explanation on project background research and study that relevant to this project. Among the topics are computer base information system, accounting information system and multimedia presentation. This chapter focuses on related programming concepts such as consideration of programming language tools, databases and authoring tools that available to develop the system. In addition, the comparative studies of an accounting software systems that commonly used currently is covered.

Chapter 3 : System Analysis

This chapter emphasizes on the analysis of the project's requirements. It explains how the system and run-time requirements for this project were analyzed and the results of the analysis.

Chapter 4 : System Design

This chapter explains the conceptual and technical design of the system. It covers the selected programming languages, software and operating system and design the process, database and user interface for the system.

Chapter 5 : Implementation and Testing

This chapter gives a description of the environment in which the system was developed and implemented. It also discusses how the system was actually tested.

Chapter 6 : Evaluation and Conclusion

The problems encountered during the development of the system are given. An evaluation of the system in terms of strength and limitations are also given together with suggestions for future enhancements for the system. This chapter ends with a conclusion of the whole project.

CHAPTER 2
LITERATURE RESEARCH

Chapter 2 Literature Search

Literature search involves preliminary research on the feasibility of the project and obtaining an in-depth knowledge of the project to be able to define the project objects that are to be attained as well as the scope of the project. This is accomplished through research on materials pertaining to EasyAccount system. This chapter included the project background study, related programming concept, related operating system and comparative studies of current system.

2.1 Project Background Study

2.1.1 Information

2.1.1.1 What is information?

Information is a set of data that have been matched to a particular information need. Information has meaning inspired in some context for its receiver. Some kinds of information can be converted into data and passed on to another receiver. It has a higher level of organization imposed by its relationship to a specific information need.

Relative to the computer, information is made into data, put into the computer where it is stored and processed as data, and then put out as data in some form that can be perceived as information. Information is used to perform basic job functions and make personal choices. Managers use information for planning, organizing, leading and controlling. Organizations collect information to use, sell and leverage it for strategic advantage.

2.1.1.2 Computer Base Information System (CBIS)

Information system is a set of interrelated elements or components that collect (input), manipulate and store (process) and disseminate (output) data and information, and provide a feedback mechanism. CBIS is composed of hardware, software, databases, telecommunications, peoples and procedures that are configured to collect, manipulate, store and process data into information.

A Computer Base Information System evolves through stages--planing, analysis, design, implementation and use. These stages are called the system life cycle and can be carried out by the user alone or by the user working with information specialist. The computer

portion of the information processor contains each of the computer base application areas -- Accounting Information System, Management Information System, Decision Support System, the virtual office and knowledge-based systems. So CBIS used to describe the five subsystems that utilize the computer.

2.1.2 Accounting

2.1.2.1 What is accounting?

Accounting is the process of recording, classifying, summarizing, reporting business transactions and interpreting their effects on the affairs of a compnay. [20]

Accounting is a branch knowledge that according to the notebook, classification, summarization, analysis and, interpretation of business record and result prediction and wealthy of an entity. Accounting is a process to identify, measure and propagate the economy information of an entity attends to consider and make decision by the information user. [19]

2.1.2.2 Accounting Information System (AIS)

A firm's data processing task are performed by an AIS that gathers data describing the firm's activities, transforms the data into information and makes the information available to users both inside and out the firm. Produces some information output in the form of standard reports. The reports are especially valuable in the financial area of the firm and at top management levels. It provides the rich database that can be used in problem solving

- Bookkeeping

  Bookkeeping is the systematic recording in books of accounts of the business transactions of a company. Nowadays, they have many companies that record the business in computerize accounting systems.

- Double entry system

  A business transaction is defined as any event that affects the financial position of a company and requires recording. Each transaction affects two items in account. To

record business transaction, ledger book which is contains many accounts is used to record transaction in note form.

- Finance Statements

  Income statements is a collection of balance sheet, profit and lost accounts, notes and others statements that used to depict the really and wary about the company business, and the profit or lost during the time.

2.1.3 Multimedia presentation

2.1.3.1 Background

Multimedia is the combination of several media forms, in particular the data, voice and visual media which facilitate effective communication exchange with the help of computer. The integration of text, sound, graphics, video and animation in an interactive environment gives rise to the potential to change the way audience react to the information.

2.1.3.2 Why Multimedia?

- Multimedia is interactive. It is a new way to communicate. It involves creating synergy between sound, images and text. The human mind develops and learns by association and reinforcement.
- Multimedia allows for better opportunities for association because of its use of hypermedia techniques. Hypermedia allows for the creation of non-linear story-lines through a multimedia document.
- Good multimedia is designed so that the user can go at their own chosen pace through it, skimming over a subject or digging deep, as the need arises. Good multimedia moulds itself around the characteristics of the user, giving them the information they want, in the form they want it and at their desired pace.
- Good multimedia can simulate the real world, and can be particularly helpful where that real world contains hazardous elements, or high cost-to-action situations. It involves the user, inviting them to evaluate situations and make decisions.

2.1.3.3 Multimedia tool

Multimedia tools is a powerful component library created especially for developing multimedia applications. It is extremely easy to use and yet very powerful. This library has incomparable visual design capabilities, flexible architecture of components, optimized code, and professional looking visual control design. Multimedia tools is the most complete library in existence on the market. [4]

2.1.3.4 Animated Presentations

Enhance applications with animated presentations:

- *Streamline code with CurrentProject and CurrentData.*

  The AllReports solution procedure is much shorter than the earlier DAO alternative. It's also easier to write because you're only working with one object--AccessObject. As long as you can get the job done with the AccessObject properties, you can save yourself a lot of work and several lines of code by using the new CurrentProject and CurrentData objects. It may take a little while to get used to, but you'll soon find that Access 97's new objects are well-worth learning.

- *Build custom wizards to simplify complex tasks for end users*

  Most likely, your users are much less familiar with Access's nuances than you are. A task that's easy for a developer to accomplish may be unthinkably confusing to the end user. When your users must perform tasks that they're unfamiliar with or that require several steps, you may want to include a wizard in your applications to walk them through the process. In this article, we'll show you the basics of creating a custom wizard that functions like Office's native wizards. We'll discuss the overall technique and give you enough information so that you can start experimenting on your own. [1]

2.1.4 Software package

The first time user tends to use off-the-shelf programs written by software specialist and these are called software package.

2.1.4.1 Software

Furthermore, the term 'software' does not simply encompass the computer programs associated with some application or product. As well as program, software includes all documentation which necessary to install, use, develop and maintain these programs. For large systems, the task of constructing such documentation is complete in magnitude with the task of program development.[2]

2.1.4.2 Well engineered software

One of the attributes of well engineered software, namely maintainability, is a direct result of the fact that the majority of the cost of a software product are incurred after that software has been put into use. Ignoring functionality, there are four attributes which any well engineered software system should possess.

1. The software should be maintainable – as long-lifetime software is subject to change regular change, it is important that the software is written and documented in such a way that changes can be made without undue costs.
2. The software should be reliable –an appropriate level of reliability is essential if a software system is to be any use.
3. The software should be efficient – this does not necessarily mean that the last ounce of performance is squeezed out of the hardware on which the software runs. Indeed, attempting to maximize efficiency can make the software much more difficult to change. Rather, it means that a software system should not make wasteful use of system resources such as memory and processor cycles.
4. The software should offer an appropriate user interface – it is now clear that mush software is not used to its full potential simply because the interface which it offers makes it difficult to use.

The problem which must be faced is attaining the optimum level for each of theses attributes given that some are exclusive and that all are subject to the law of diminishing returns. The reason for this is that the software may have to run on a computer where weight and size considerations restrict the power of the hardware which can be used and the software may have to run in a relatively small memory with little or no backing store. [2]

2.1.4.3 Software maintenance

Operation and maintenance normally are the longest life-cycle phase. The system is installed and put into practical use. Maintenance involves correcting errors which were not discovered in earlier stages of the life-cycle, improving the implementation of system units and enhancing the system's services as new requirements are perceived.

During the final life-cycle phase, information is fed back to all previous development phases. This final phase is an operational phase where the software is put into use. During the use, errors and omissions in the original software requirements are discovered, program and design errors come to light and the need for new software functionality is identified. This means that software modifications are necessary and this modification activity is usually called 'software maintenance'. [2]

Maintenance is not simply an error-correction activity but may involve changes ion requirement s, design and implementation, or it may highlight the need for further system testing. Unfortunately, this is often not properly recognized and after the software maintenance is simply seen as a single activity carried out after the software product has been delivered. In fact, what really happens is that the development process is repeated many times during the maintenance phase as modifications are incorporated in the software.

2.1.5 Computer system

2.1.5.1 Introduction

A computer system is an integrated combination of software, hardware, communication, human resources, information requirement and processing procedures. Anyone of these components is by itself of little value in satisfying computing needs, for example, a personal computer cannot process payroll without an appropriate software program. Computer software or computer programs, contain the instruction required for the physical machine to complete the desired task, which in the case of payroll would include calculation the total pay the with holdings for each employee.

2.1.5.2 Computer Aided Learning

The benefits of CAL:

1. Simplicity – whether the students are at home on weekend or on a vacation, as long as they bring along the CD_ROM, they can study or just read through the notes. This unlimited access means that with some careful planning everyone can fit in study time when it suits their best.
2. Flexibility – is the fact that the students are in control or their own program. They have their materials and their objectives, so they can set their own learning pace. If they any difficulties with one aspect at their studies, all they have to do is just go through explanation section again and again. They don't need their tutor to be there as everything is on the CD-ROM and they can be secure in the knowledge that they are holding no one back.
3. Productivity – as a Malaysian, out country is going into a new era and changing its images to computing and information technology. Even the government is changed into the 'electronic government'. As to keep to that phase set and not to be left out in every single aspect, CAL seems to be too little compared to the fact above. But it trains the student to be familized with the independent. These will make a student more productive, technically and mentally. Furthermore productivity and quality is what a nation desperately wants in order to squeeze into first world countries. [4]

2.2 Related Operating System

2.2.1 Microsoft Windows NT Server 4.0

Windows NT server is a network operating system that provides the connectivity, the base services and the administrative tools to deliver services across a distributed network of computers. Beside that, it is built to served as both a file and a printer server as well as a manager of large application databases.

It's very likely that in the next two years many of us will be using Windows NT in our workplace, because Windows NT is arguably the most powerful operating system platform available for client-server computing.

What does Windows NT 4.0 have to offer?

Although Windows NT 4.0 at first glance looks identical to Windows 95 (indeed it has the same user interface) it's its reliability and security aspects that are critical to business.

In business, where downtime of a system is critical, reliability is a key issue. Another key issue in business is the protection of critical/sensitive information. Windows NT includes built-in data protection to protect business-critical information, integrated security to prevent inadvertent or deliberate tampering with data and increased operational reliability. With Windows NT, hardware failure is minimized and recovery in the case of failure is quick. Integrated tape backup and disk management features are also included to ensure a high level of data protection. There is also additional protection against hard disk failure with disk mirroring and striping with parity (RAID 5). Both of these facilities ensure non-stop access to critical data even in the case of hard disk failure.[4]

Windows NT's integrated security protects against data theft or loss and enhances operational reliability by protecting against user error or tampering. Users retain their highly personalized desktop, while system administrators can fully, flexibly, and remotely control system access through various levels of user access rights and permissions.

Here are just some of the features of Windows NT 4.0:

- Pre-emptive multitasking. This allows users to run multiple applications simultaneously and integrate personal productivity and business-critical applications. It also ensures excellent system responsiveness.
- Protected memory. This ensures that multiple applications can run simultaneously without interfering with one another or with the operating system itself.
- Windows NT can access up to 2 GB of memory per application and more than 408 million terabytes of data storage.
- Symmetric multiprocessing (SMP). This allows users to add additional processors to their hardware and benefit from corresponding performance boosts without making any changes to their system or applications software. The Windows NT platform can support up to 32 processors and currently supports more than 20 different multiprocessor hardware systems.
- Integrated networking for basic file and print sharing and easy access to enterprise resources.
- Built-in workgroup features, including electronic mail and group scheduling.

- Same user interface as Windows 95. This means a shorter learning curve for new users. [4]

2.2.2 Linux

Linux isn't an operating system for the timid computer novice. They see the PC as a tool to get to e-mail, word processing, or the Internet. They don't see the fun in tweaking, nudging, and configuring an operating system. [5]

Linux isn't an OS for people who feel comfortable with their existing applications. Even when you can find similar applications -- and that can be tough -- there's the problem of converting your existing data over to the new Linux application. There's no Office 97/2000, Outlook, Internet Explorer, Quicken, TurboTax, SimCity, or America Online. [5]

Not the version of Windows running on most desktops, and won't be for many years. Windows "Millennium" is the successor to Windows 98, and those mainstream versions are the markets that hardware and software vendors are focused on serving. All of the other OSes are reduced to relying on self-help groups. [5]

2.2.3 Windows 98

Microsoft Windows 98 Second Edition is the latest version of the Windows operating system. Designed for consumers, Windows 98 Second Edition allows PC to work better and play better. [4]

1. Better performance and reliability

   Microsoft Windows 98 improves on key areas that keep users waiting on their PCs today, including opening applications an average of 36 percent faster, rendering Internet pages up to 25 percent faster and shutting down the PC up to two to five times more quickly than with Windows 95. In addition, Windows 98 can provide users an average of 28 percent more disk space through more efficient storage of data on the hard drive.

   Key performance and reliability features include the following:

- Setup enhancements reduce the number of setup steps, allowing for a faster and simplified setup.
- Applications load faster by identifying the most frequently used applications and placing the files associated with their startup together on the user's hard drive so they load quickly.
- Faster shutdown dramatically reduces the time needed to shut down the computer.
- More disk space is available as a result of the ability to store information more efficiently with a new feature called FAT32.
- Windows Maintenance Wizard automatically schedules and executes "tune-up" activities to keep users' PCs running in top form.

2. Improved ease of use and Internet access

Windows 98 was built on customer feedback and with the goal of delivering a simple, easy-to-use operating system. This focus combined with the rapid growth of the Internet over the past three years has resulted in an operating system designed with the consumer and the Internet in mind. Windows 98 integrates both the navigational paradigm of the Web and graphical nature of HTML to provide users with a much richer and simpler experience.

3. A new generation of hardware and entertainment

Just as Windows 95 enabled a range of new software applications, Windows 98 SE empowers a new range of hardware and entertainment functionality. [4]

Similarities

Windows 98 and Windows NT provide more functionality than most people will ever use. They both offer all of the features listed below.

- Updated Windows interface
- Preemptive 32 bit multitasking
- OLE and the 32 bit API set
- Ability to run 16 bit applications
- Full range of network connectivity
- Built-in remote accessibility

- Open system management
- Secure user profiles for control of access

Windows 98 is a combination of 16-bit and 32-bit code. Windows NT is all 32-bit code. Now, all processors from the lowly 386 on up have been 32-bit processors. DOS and Windows 3.1 started out as 16-bit programs that you could run on a 286 or higher. What it boils down to is that Windows NT is supposedly up to 40% faster than Windows 95/98 when running 32-bit programs. [25]

For most users, NT's biggest drawback is its limited hardware and software compatibility. Most of the products we tested ran under it, but there were some important exception, and NT's lack of Plug and Play hardware configuration didn't help. [26]

Even in the best of circumstances, trying out a new operating system is a major undertaking, and Windows NT has its unique obstacles. A minimum 110MB of free disk space is needed, which may prove a daunting amount of storage to give up. NT isn't compatible with DOS's and Windows 95's DriveSpace disk compression. [26]

Table 2 Comparation between Windows 98 and Windows NT

Technical Area	Windows 98	Windows NT
Hardware requirements	386-486 with 8-16 MB RAM	486-Pentium with 16-32 MB RAM
Compatible of software	Support most Windows and MS-DOS applications	No support for applications that directly access hardware
Performance	Pre-emptive multitasking for only 32-bit application	Pre-emptive multitasking for all applications
Reliable of the new operating system	Improved over Windows 3.11	All applications run in protected memory space
Security	Support for server-based validated logon	Complete protection down to the file level

2.3 Related programming concepts

2.3.1 Consideration of programming tools

2.3.1.1 JAVA 1.2

Java is one of the world's newest and most popular general-purpose language and Internet programming languages, because Java is a significant development. Originally, Java was primarily designed for developing software for consumer products such as television sets and VCRs. To this end, the designer of Java wanted to be small, simple, efficient and portable to a wide range of hardware devices. For the same reason, it soon became apparent that Java is also an ideal language for developing software for distribution over the Wold Wide Web (WWW). The WWW is after all a collection of resources stored on multiple computers running on multiple operating systems. [11]

In many ways, Java is like C/C++. Its syntax is quite similar to that of C/C++. Java however avoids some of the complexities of C/C++. Java is an object-oriented computer programming language. Java is both a general-purpose programming language as well as an Internet programming language. Java programs can run as stand-alone applications all by themselves such as the programs written in Pascal or C/C++ language. But Java programs can also take the form of applets. [11]

2.3.1.2 Visual Basic 6.0

The native database engine for Visual Basic is the same system as Access uses. It is called the JET engine. Queries and other database functions are done using the SQL language. Visual Basic has no direct way of creating tables and queries, all must be done using coding (or in some instances the Database Access Object). With Access, queries and tables can be easily created and modified. Since Access is a database system by nature, it is best suited for mainly database jobs. [14]

The three flavors of Visual Basic are Visual Basic for Applications, VBScript, and Visual Basic. Visual Basic for Applications is primarily thought of in terms of Microsoft Excel to create macros, but that's only a small part of it. VBScript is most commonly used in Active Server Pages and the Internet. Visual Basic has been widely talked about in Spectrum and is considered a full compilable programming language. [20]

The Visual Basic programming language have been chosen by the MultiValue Environment due to its ease of use and the MultiValue BASIC-like programming structure. With little extra work, a MultiValue programmer can write Windows programs using Visual Basic without having to relearn how to program in a different language syntax, for example Visual C++. [20]

Visual Basic Learning is the most productive development tool available to quickly create professional applications for Windows. Visual Basic is fine for simple projects. However, Delphi 5 is far superior in so many areas. For examples are exception handling, memory management, multi-threaded applications. Application can be compiled into one .EXE -- no DLLs, no OCXs.

2.3.1.3 Visual Basic 6.0 versus Java 1.2

A future version of the Internet Explorer browser will speak Visual Basic Script. This is new. Microsoft describes VBScript as a high-performance, cross-platform subset of VB that can be used to create animated, interactive Web content -- sounds like Java, no? It will speak OLE, allowing Web applications to link to hundreds or thousands of existing Windows programs and databases. And, like Sun, Microsoft will license VBScript freely to all vendors. [8]

Microsoft almost as an afterthought announced its plans to license Java from Sun. A future version of Internet Explorer will interpret Java applets and JavaScript. Gates slugged back a jolt of Java and to all appearances it affected him about as much as if he'd already downed a quart of amphetamines. VB is the most widely used language environment in the world – Microsoft claims 3 million developer users. [8]

2.3.2 Consideration of Database Server

2.3.2.1 Microsoft SQL Server 7.0

SQL Server 7.0 is the leading Microsoft Windows database, bringing scalable business solutions, powerful data warehousing and integration with Microsoft Office 2000 to the enterprise. It is design specifically for distributed in client/server computing.

Furthermore, SQL is tightly integrated with the Microsoft BackOffice family of servers in order to reduce the cost and complexity of deploying sophisticated applications. Being integrated allows SQL Server to work extremely well for both corporate developers and independent solution developers because they could create a solution where components can be brought in, as and when they need it. They don't have to purchase third-party components. Integration also indirectly means that it is easy to manage and deploy technologies.

As for the database repository, Microsoft SQL Server is the solution to be used with Windows NT Server. It can handle more concurrent users compare to Microsoft Access. SQL server can be queried and updated via popular Web browser.

2.3.2.2 Lotus Notes Release 4.5:

Lotus Notes Release 4.5 is a distributed client/server platform that allows you to develop applications to be shared by groups of users across a network. The Integrated Development Environment (IDE) provided by Notes enables the development of strategic enterprise-wide business applications. [7]

Lotus Notes allows data to be collected, stored, organized and disseminated among many users on one or several networks. It uses the Windows interface in networked client server architecture. It supports GUI and provides some graphic component tools such as button, text field, combo box and etc. [21]

2.3.2.3 Microsoft Access 97

MS Access is a relational database management system used to create and manage the relational databases. Using the ODBC driver for Access, data can be retrieved from the database in the client/server system.

MS Access supports/provides Visual Basic for Applications; this may be a good starting point for you to learn by slowing converting your macros into equivalent VBA modules. I think you'll find that VBA meets most of what you can do in a macros must more

efficiently AND allows you to manipulate the Access objects and records more effectively.

The following table depicts the primary considerations for using Access or SQL Server as the back-end database for your Membership Directory. [6]

Table 3 Characteristics of Microsoft Access and SQL Server

Access	SQL Server
Size limitation of 1GB.	No size limitation.
Should not create an entry with an RDN over 230 characters in length.	Can create entries up to 255 characters in length.
Cannot use search strings containing % (percentage) or _ (underscore) characters.	Can use search strings containing % (percentage) or _ (underscore) characters.
Code page is the same as that for the computer.	Code page is determined when the database is first set up.
One LDAP Service must reside on each computer containing Access.	LDAP Service does not have to be on the same computer.
Must shut down the LDAP Service to back up the database.	Do not have to shut down the LDAP Service to back up the database.

For a quick background on the difference between a desktop application, such as Access, and an enterprise-level database, such as Microsoft SQL Server, it might be helpful to think about a continuum. The two database solutions are complementary yet operate at different ends of the spectrum and meet different customer needs. The right database for a particular situation depends on several factors, including scalability (number of users, size of data), reliability (mission-critical data, such as corporate payroll versus potential sales contacts) and available database experience (Office user versus professional database administrator).

A client/server database, such as Microsoft SQL Server, differs from a file-server database, such as Access, by providing greater scalability and reliability for data that is mission-critical for the enterprise. Access databases typically service individuals and

small groups (10–20 users) with no more than a megabyte of data, which could easily be processed on the desktop.

2.3.3 Consideration of Multimedia authoring tools

Authoring tools help us to put various multimedia elements together and run them in one audio-visual show - the softwares that create multimedia with. *Microsoft's* Power Point has been a rage for quite some time now. [10]

Multimedia authoring is the process of bringing together a diverse set of media objects (multimedia) and organizing them into a pleasing program. There are many software packages that can do these things, some better than others. Few of them can do all the things necessary to insure trouble free performance. Key factors to consider are:

- Must easily incorporate many different media items such as audio, graphic images, animations, video clips, transitions, etc.
- Must be able to be upgrade so that it can take advantage of changing technology.
- Must have high productivity so the artist can create large quantities of high programming in a short time.
- Must work within a large of third party software packages so that specialized capabilities can be added on at low cost.
- Must be scaleable so that one or many users can operate the software without conflict
- Must support a 'changes-only' architecture so that small changes in programming do not require the transfer of large amounts of data. Only changes should be transferred. [18]

2.3.3.1 SCALA

SCALA is a user-friendly multimedia authoring tool that helps to create poloshed, professional on-screen productions that combine maximum impact. SCALA also supports interactive buttons that makes applications to respond to user choices.

Scala software is used worldwide to create dynamic multimedia productions with text, graphics, animation, sound and video, for broadcast via corporate intranets or the Internet to television-based displays or computers. Working with its global distribution network,

Scala offers powerful solutions that meet its customers' growing needs to reach diverse audiences with engaging content. [9]

Integrated line of interactive multimedia authoring products is changing the way the world creates and views multimedia. All share an award-winning point-and-click authoring environment and incredible playback performance with the look and feel of broadcast television productions. [9]

SCALA can be used to create number of multimedia applications such as:

- multimedia 'slide-show presentation for corporate business, seminars
- interactive books and CD's
- point of purchase information screens
- games/quiz/education material
- television videos

2.3.3.2 Macromedia Director 7.0

It is an optimized playback engine for smooth, fast multimedia performance. Director's easy-to-use visual metaphor helps to turn around multimedia in Internet time. Director 7 provides rich interactivity with graphics, sound, text, video, and more. Shockwave is the Internet's high-speed, low-bandwith engine for multimedia. Director's authoring environment is Internet-optimized with support for Internet standards like Java, HTTPS, XML, and more.

Macromedia Director 7.0 is an authoring tool developed by macromedia. It has been upgraded with new features like embedded fonts, scaling and rotation of sprites, alpha channels, multi-user, support, and new Internet optimizations. Macromedia's Director7.0 is a pivotal technology, allowing developers to create a rich interactive experience both on the web and CD-ROM.

One of Director's most powerful features is Lingo, a programming language that controls the behavior of almost any element in Director. For user interactivity, Lingo makes it

possible to transform animation from something you watch into something you participate in. While Lingo is approachable for nonprogrammers, to truly take advantage of its power requires considerable study.

Director 7.0 is a time based authoring program. Instead of cards or book pages, Director movies are made of series of individual frames. As the movie is played, frames are displayed revealing their elements. Because time based authoring program work by displaying a series of frames, they are especially good tools for creating animations. [15]

2.3.4 Consideration of Sound Edit tools

2.3.4.1 Cool Edit 2000

Cool Edit 2000 is an product of WORKING (c) Syntrillium Software Corp. If your Windows computer has a sound card or sound module (as almost all do), Cool Edit 2000 can turn it into a recording studio with all of the features used by professional audio engineers. It can be used to record user own music, voice or other audio, edit it, mix it with other audio or musical parts, add effects like Reverb, Chorus, and Echo to it, equalize it, and master it so that can burn it to a CD, post it on the World Wide Web, or email it.

Once you've got something recorded or loaded into it, you can cut, paste, and move audio around just as you do text in a word processor. And if you make a mistake, the undo feature will let you back up and try it again. Cool Edit 2000 has more than twenty fantastic audio effects and tools like Echo, Flange, Compression, Amplify, Noise Reduction, Reverb, Time/Pitch stretch, and much more.

When you're all done, you can compress your audio MP3 or Real Media G2 to post on the web or email it to your friends. If you'd rather burn it to CD, Cool Edit 2000 can prepare the audio for that. If you've found yourself on the leading edge, and need audio for DVD, you'll appreciate Cool Edit 2000's support for 24-bit/96kHz files.

2.4 A Study of Current System

I browsed through a few accounting/multimedia packages similar in nature to mine, example UBS accounting packages and Peachtree complete accounting. By looking through the UBS package, I observed the screen layout and interfaces, buttons design and colour schemes.

2.4.1 UBS Accounting System

The mostly used accounting system currently in the market is UBS visual business 99 v5.0 package which is including the payroll system, accounting system, point of sale system, stock control and time attendance. Here in this proposal, I was studied on the accounting system in UBS package in order to learn the function and interface of the system.

I was also studied on the UBS education package which is widely used in accounting college or company. The UBS education is a multimedia learning package which is provided by the sound and animation of suite colour of interface while user was learning the UBS visual business system. The user will be able to build a full-set of accounting after the learning of UBS education package.

Standard basic features include: -

- Multiple Company
- Multiple languages – English, Bahasa Malaysia, Chinese and Thai.
- Manufacturing Account
- Instant posting
- Export to Excel facility
- Easy entries for omitted transactions of previous months [22]

2.4.2 UBS Accounting System lacking

From the current system studies, I notice that UBS not a package for secondary student especially the SPM accounting student. Below are the some of the shortages:

1. Starting data entry from ledger to journal to get and report the following statements such as trial balance, income statement and balance sheet. That is not as usual what students have learned, normally they are starting from journal.
2. Accounting system didn't provided by icons in the user interface.

3. Instant posting that still need double data entry
4. The learning tool is based on the UBS system that not includes the syllabus especially for SPM accounting student.
5. The UBS package didn't provided maintenance of learning tools and accounting system.

2.4.3 Features of EasyAccount

After studies on the existing system in the market currently, I do noticed that it was lack of administrator system either for learning package or accounting system. There are some features in EasyAccount that will cover the shortages:-

1. Starting data entry from journal not from ledger, easy for student.
2. Automatically posting the journal and ledger into income statement and balance sheet.
3. Learning tools for the accounting student especially secondary school used. Student is provided with important reference of form four and form five standard of account subject.
4. Notes can be printed out. Exercise module and Quiz module is provided to student as a examination of the understanding of lesson chapter by chapter.
5. Administrator section is given to teacher as to maintain in the selecting the suitable set of exercise according to chapter and pass year question as a final examination overall the chapters for the student.

CHAPTER 3
SYSTEM ANALYSIS

Chapter 3 System Analysis

3.0 Introduction

System analysis is the study of a current business and information system application and the definition of user requirements and priorities for a new or improves application [12].

This chapter will describe the analysis of the current system. The system analysis part commences with an investigation of the current system and concludes model (ER – Diagram) and etc. Requirement analysis enables the system engineer to specify software function and performance, indicates software interface with other system elements, and establishes design constraints that the software must meet.

The system analysis consists of three phases [12]:

1. Survey project feasibility (survey phase)
2. Study and analyze the current system (study phase)
3. Define and prioritize user's requirements (define phase)

Requirement analysis is done during system analysis. Requirements are activities include analyzing and determining functional requirements and non- functional requirement.

3.1 System Requirements

There is a requirement characteristic for the development of each and every system requirement need evaluation. Apparent information requirements of the module and end-users are known, but verification and assessment are needed.

Activities in requirement determination are:

- Requirement anticipation which means foreseeing module or system characteristics by investigating areas and issued related. This task is accomplished by previewing multimedia

educational software and encyclopedias. It is to determine extra functions that are useful which can be put inside the module that is to be developed.

- Requirements specification which leads to the analysis of data describing the system to determine how well it is performing, what requirements must be met and strategies for full filling them.

A requirement is a feature of the system or a description of something the system must to do in order to achieve the objectives of the system. The requirement process is first seeks to elicit the user's requirements by develop prototypes of some parts of the system, then the requirements captured in a document or database. The requirements are often refined and expressed more concisely so that it can be transformed into a good design. The system is then verified to ensure that the requirements are complete, correct and consistent. Finally, the system is validated to ensure that it meets the business needs.

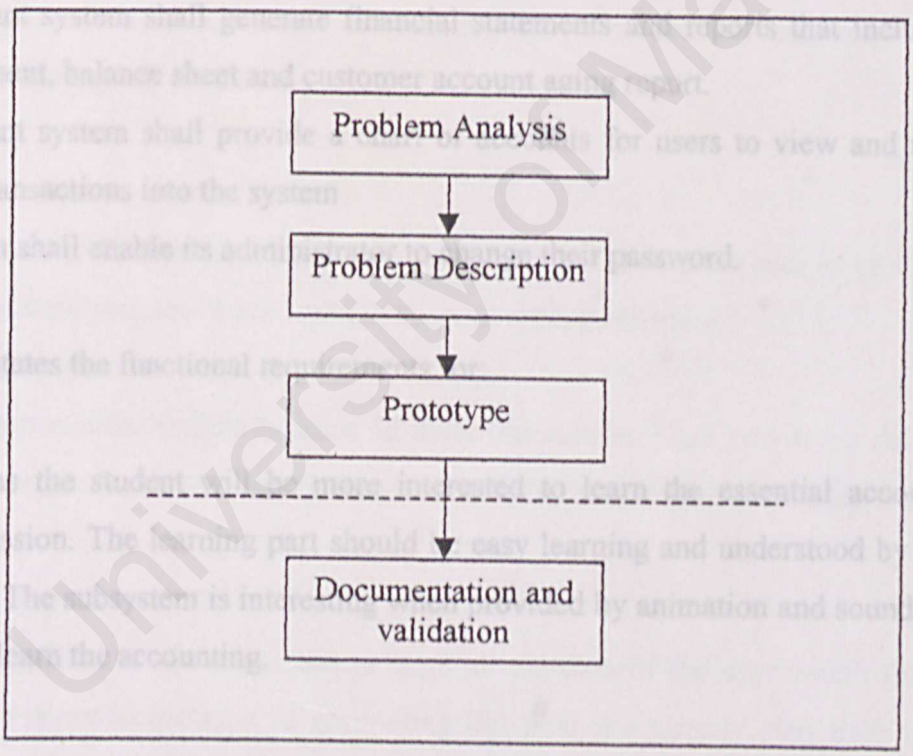

Figure 2 Requirements Determination Process

3.1.1 Functional Requirement

Requirement analysis analyses and determines functional requirements and non-functional requirement of EasyAccount system. Functional requirements capture the task that the business

must perform and as such it does not include implementation details such as what hardware (computer) or software (operating system, language) the system must use.

Functional requirements are functions or features, which are expected by the user and stated by them to be incorporated into the system. The system is considered incomplete if any of the necessary functional requirements for EasyAccount system. The requirement of EasyAccount as below:-

1. The EasyAccount system shall provide four journals to handler everyday transactions. This system shall allow the user to add, edit and delete transactions in these journals.
2. The account system should be able to handle receivables by storing all receivable information that include customer ID, name, add, number and beginning balance, and also by updating the current balance that this customer owes the company.
3. The account system shall generate financial statements and reports that include profit and loss statement, balance sheet and customer account aging report.
4. The account system shall provide a chart of accounts for users to view and refer to when entering transactions into the system
5. The system shall enable its administrator to change their password.

This sections states the functional requirements for:

1. *Interesting*

   The user as the student will be more interested to learn the essential accounting in the learning session. The learning part should be easy learning and understood by the user in a short time. The subsystem is interesting when provided by animation and sound direction for the step to learn the accounting.

   The appropriate way to convey learning material is through audio and visual. Illustration, diagram and pictures will describe and give a clearer view of a message. Audio will keep the attention of the audience. With the right time, it will ensure an effective educational program.[4]

2. *Administration*

Administration is one of the main library subsystems. Only authorized user allows to logon to this subsystem. This subsystem should allow a user to view, edit, delete and print details of pass year question and exercise of lesson. In addition, this subsystem should be able to integrate with the other subsystems easily such as the learning session.

3. *Adaptability*

If a design is to be maintained, it must be readily adaptable. This implies that its components should be highly cohesive and loosely coupled. Adaptability means the design should be well documented, the component documentation should be understandable and consistent with the implementation, and the implementation should be expressed in a readable way.

3.1.1.1 Automatic Accounting Modules

This section allows authorized users to maintain the EasyAccount database. This module contains the following sub modules: -

- **System**

  The System modules contain chart of account, which is allows the user to view the available account and their respective account ID, account type, description.
- **Daily Transaction**

  The daily transaction module handles all daily transaction. User key-in the daily transaction in the form of Journal. The entire transaction wills automatically posting from Journal to Ledger.
- **Opening Entry**

  The Opening Entry module was use to store all the data of the user which first time using accounting system in the type of computing but their are already start their business long time.
- **Debtor**

  The Debtor module handles information about the debtors.
- **Creditor**

  The Creditor module handles information about the creditors.

- **Reports**

  The Reports module handles trial balance, income statement and balance sheet.

- **Help**

  If students need any help, help section is a best solution for them. Including search function and about system.

3.1.1.2 Accounting Learning Modules

This module is designed to present useful and comprehensive text. This module contains the following sub module:-

- **Learning**

  This section contains 14 chapter accounting lesson in order to fulfill SPM accounting syllabus. I will take part in 5 chapters with are Preparation for Income statement, Cash Book, Control Account, Account Definition and Finance Statement. The main title for each chapter will show in Appendix A.

- **Exercise**

  This exercise sub module also contains for 14 chapters, which enable user to find out the level of understanding of the lesson. Answer is provided together with the question to the user. After user sent the answer, the result is recorded in student exercise result database. Users also can check their own result chapter by chapter by themselves.

- **Pass Year and Forecast Question**

  This sub module provides 2 sets pass year question (1998 and 1999 year) and 1 set forecast question, which cover the syllabus of SPM Accounting. This section is using to test out the understanding and performance of the user in overall lesson that had been given. An complete answer is provided together with the question to the user. After user sent the answer, the result is recorded in student SPM result database.

3.1.1.3 System Administrator Modules

This module is my major task in this project that designed especially for authorized teacher to maintain the EasyAccount learning section. Before go in to the system, user must sign in with

their user ID and password. With this module, future maintenance and enhancement works will be simpler, paperless and consumes less time. This section contains the following modules: -

- **System**

  The System sub module contains three options that are for user login, change password and logout. Username and password are encouraged to change periodically in the by the authorized user. Tips also given for administrator helping in may face some doubts.

- **Information**

  Only the authorized teacher can handles all the functions. Administrator can access the Student and Administrator Personal Details.

- **Exercise**

  This sub module contains 2 set exercises for 14 chapters that allow user to select the existing exercise. Exercise Question and Answer also provided to user for reference and printed it out. User also can access the Student Exercise Result to analysis the student performance and understanding.

- **Pass Year And Forecast Question**

  The SPM Question contains 2 set Pass Year Question and 1 set Forecast Question to be selected into create an another new forecast question. This sub module including the Student SPM Question Result for teacher easy to analysis student performance in coming examination.

3.1.2 Non-functional requirements

The non-functional requirements of the system are the constraints under which the software must operate, should be expressed and related to the functional requirements. It also constraints placed on the system such as what hardware and/or software the system must use.

Non- functional requirements are included in order to enhance system performance, and describe the constraints imposed on the system. Non- functional requirements are as important as the functional requirements. This sections states the non- functional requirements for:

1. *Maintainability and expandability*

   The most important design quality attribute can be maintenance. Maximizing cohesion in a component and minimizing the coupling between components is likely to lead to a maintainable design.[2]

   The software can be understood, corrected, adapted and enhanced. The software should be possible to evolve to meet changing requirements. Maintainability is the degree to which architecture, data or procedural design can be extended. EasyAccount system is designed to be easily maintain and expand. The system can be corrected should an error is encountered, can be adapted should there be changes in requirements, or enhances in the future.

2. *Modularity*

   Modularity is a key factors in good program design. The working of the system was broken into modules so that distinct functions of objects could be isolated from one another. This characteristic makes testing and maintenance much easier. In EasyAccount system, modularity of program is applied as this will head to easy modification in future. The modularity in design approach means other shell modules may also be easily combined or joined at a later time.

3. *Usability*

   This system should have an appropriate user interface and documentation. Prompts and messages are displayed to guide the user along the operation of this system. EasyAccount system utilizes the Graphical User Interface. The GUI provides better visual meaning to the user. The usage of suitable and meaningful icon will help ensure that users use the system with more confidence. Related functions are grouped together.

4. *User friendliness*

   The system should have a user-friendly interface because users may be non-technical personnel who could not be able to comprehend complex interface. The system should use the GUI approach in order to provide better understanding of how to use the system and better communication between the system and users.[4] Most multimedia educational

packages establish this feature through the usage of only the click of the mouse, visualize the movement of buttons and scroll bars.

The system should be designed in such a way that the users would both feel uneasy or frustrated in using the system. Menu-driven system and clearly labeled command buttons should be used whenever possible. The screen design of the system should be consistent and dialogue box messages should be clear and simple. The system should provide error handling and validation procedures as another mean to assist users in using the system.

5. *Response time*

System's response time becomes an important issue when the database become very large. The user should not ask to tolerate with the slow system's response time. To solve this problem, better and faster hardware is needed. Refer to the front chapter for the hardware and software requirement.

6. *Reliability*

Reliability is the extent to which a program can be expected to perform its intended function with requirement precision. Therefore, the system should be reliable in performing its functions and operations. To ensure system reliability, exhaustive testing should be carried out. The system should not cause destructive error to user's machine. User's errors should be recoverable.

7. *Robustness*

The system should be robust enough to handle expected or unexpected system failure. Any errors detected will either be corrected or eliminated. Again, the robustness of the system is achieved after thorough testing.

8. *Flexibility*

The system should exercise a high degree of flexibility. Exercise of such flexibility are reports could be printed to the screen as well as to the printer, item or user list could be printed in full or partial and by a sorting order chosen by the user.

3.2 Run Time Environment

The Run Time environment consists of hardware and software configurations.

3.2.1 Hardware configuration

If the system is to be implemented on special hardware, this hardware and its interfaces should be described. If off-the-shelf hardware is to be used, the minimal and optimal configurations on which the system may execute should be set out here.The following hardware specifications for EasyAccount run time environment:

Table 4 Hardware Specifications

Component	Description/Comments
1) Microprocessor	• 486 DX/ 66MHz or higher processor PC (Pentium or higher processor recommended)
2) RAM	• 12 MB RAM for Windows 95 or Windows 98 (16 MB recommended)
3) Storage	• 30 MB minimum hard disk space (22 0 MB for complete installation)
4) Video monitor	• VGA or higher resolution monitor, SVGA Graphical Adapter, 14" inch and above
5) Input device	• Keyboard and mouse
6) Printer	• Dot-matrix or Bubble Jet or Jet printer
7) Speaker	• 130 watt and above

3.2.2 Software configuration

Sometimes, even the formulation of outline requirements for a project is impossible as the application domain is so poorly understood. It is unrealistic to expect a definitive requirements definition before system development begins and a process model based on system prototyping is more appropriate than the classical waterfall model. [2]

The following software specifications for EasyAccount run time environment:

Table 5 Software Specification

Component	Description/Comments
1) Operating system	• Microsoft Windows 95 or Windows 98
2) Application	• Microsoft Visual Basic 6 Enterprise version • Microsoft Access 97 • Macromedia Director 7 • Microsoft SQL (future expand)

3.3 Conclusion

System analysis is the most critical process of information systems development. It is during system analysis that we learn about the existing system, come to understanding problems, define objectives and priorities for improvement, and define project requirements.

In this chapter, all the survey, study and definition of the EasyAccount is been discussed. The requirements of this system are clearly specified. The development process can continue with the creation of different types of system modeling of EasyAccount.

CHAPTER 4
SYSTEM DESIGN

Chapter 4 System Design

4.0 Introduction

Systems design includes hardware and software design. System design is transformation of the specification of requirements, first into a detailed logical (conceptual) specification and secondly into a detailed physical (technical) specification. Design is the creative process of transforming the problem into a solution. Conceptual design tells the user exactly what the system will do. Technical design allows system builders to understand the actual hardware and software needed to solve the user's problem.

The two modes of design decomposition as follows:

1. Functional design – the system is designed form a functional viewpoint, starting with a high-level view and progressively refining this into a more detailed design.
2. Object-oriented design – the system is viewed as a collection of objects rather than as functions, with messages passed from object to object. Each object has its own set of associated operations

System design is the main part in system development. It determines the success of the application. Features of a system specification include a system, the components or elements of a system and, their appearance to user. Functional and non-functional requirements found in the system analysis stage are turned into design specification.[4]

The design of the EasyAccount system has considered the following design issues, for example system functionality design, effective input and output design, database design and user interface design.

4.1 Project Development Strategy

Prototype is often used as a standard procedure in the design phase. In prototyping, the user and developer work together to identify the needs of the users and to clarify aspects of the system that are unclear. The objectives of choosing the prototyping are prototype helps the developer to

capture user requirements (especially user interface) more accurately, it helps to clarify and define an ill-structured system more clearly and help to explore the feasibility of the application.

For this project, Prototyping model is used to develop the program. After a brief analysis of information requirements using traditional methods, such as observing and researching archival data, working model was constructed for the prototype. The prototype becomes a valuable extension of traditional requirement determination. User feedback about the prototype was assessed in order to get a better picture of overall information needs.

The benefits using a prototype system during the requirements analysis and definition phase of the software life-cycle are:

1. Misunderstandings between software developers and users may be identified as the system functions are demonstrated.
2. Missing user services may be detected.
3. Difficult-to-use or confusing user services may be identified and refined.
4. Software development staff may find incomplete and/or inconsistent requirements as the prototype is developed.
5. A working, albeit limited, system is available very quickly to demonstrate the feasibility and usefulness of the application management.
6. The prototype serves as a basis for writing the specification of a production quality system. [2]

4.2 Considering on the Programming Technology and Language

The main task in this section is to choose the suitable programming technologies and languages that used to develop this system. An analysis was done in order to choose the most suitable programming technologies and language. The ideal solution for this project is easy to develop and deploy, and also integration with the latest emerging technologies. The following programming technology and language are chosen in order to develop the EasyAccount system.

4.2.1 Microsoft Visual Basic 6.0

Visual Basic 6.0 is chosen because it is great for writing prototypes and some kind of database applications. Furthermore, usage of VB not only great for programming quickly but also great because it is from Microsoft.

Visual Basic programs are free standing programming environment. Windows programs can be compiled and the programs can be exported to other Windows platform. VB programs run in their own memory space, and can be written to run on both 16-bit (Windows 3.1) and 32-bit (Windows 95/98/NT) platforms. They can even run on RISC platforms running on Windows NT without changing any of the existing programs. [17]

Visual Basic also allows programmers to make Custom Controls to be used in other Visual Basic program, as well as Delphi and Visual C++. Using Visual Basic Enterprise, programmers can create n-tiered systems. This allows programmers to create programs that communicate with each other across a network to share information and resources as well as work in unison. This is useful in splitting the client and server processing thus speeding data access for users.

Visual Basic has taken out most of the multi-tasking and multi-threading complications that C++ programs normally have to contend with. It also deals with the memory issue that the higher level languages have. [17]

Visual Basic programs are created in an Integrated Development Environment (IDE). The IDE allows the programmer to create, run and debug Visual Basic programs conveniently. [27]

Visual Basic is chosen as the main programming tool in this project because of the following features:

1. VB is one of the most popular programming tools in Windows environment due to its RAD (Rapid Application Development) capability associated with it.
2. VB embedded with search engine (JET engine 1.0) that comes from the family similar to the internet engine (JET 2.0) of the DBMS used. And Microsoft Access. Both of them

share the same database format and hence. Intermediate conversion program such as ODBC is not required.

3. Furthermore, VB using event-driven approach to program the system and not a procedural language. An application developed with an event –driven model respons to event that happened in the computer environments.
4. Features of VB includes Multiple-Document Interface (MDI), Object Linking and Embedding (OLE), Dynamic Data Exchange(DDED).
5. For complex application, programmer can write hard parts in C/C++, store them in Dynamic Link Libraries (DLL). When required, this function can be called.

4.2.2 Microsoft Access 97

MS Access supports/provides Visual Basic for Applications; this may be a good starting point for me to learn by slowing converting my macros into equivalent VBA modules. I'll find that VBA meets most of what I can do in a macros must more efficiently and allows me to manipulate the Access objects and records more effectively.

Microsoft Access 97 helps organizations meet these demands by focusing on three key areas. First, Access 97 simplifies the skill set needed to create simple, useful databases—the improved interface offers more consistency with other Office applications, plus new features that increase productivity.

Second, Access 97 adds Data Access Pages—Web pages that let users interact with data over the Web and maintain live links to a database. Finally, Access 97, through its support of OLE DB, can act as a front end to high-end database engines such as Microsoft SQL Server™, making Access 97 databases more scalable than ever before. They can improve data management in your organization.

Third, Access 97 gives powerful new tools for managing data. Share database with coworkers over an intranet, find and retrieve information quickly, and take advantage of automated, pre-packaged solutions to quickly create databases.

Microsoft Access 97 is a highly customizable program. In this project where many section work with the same data, a computer administrator or consultant may have equipped Microsoft Access with special on-screen tools suited to my situation. [28]

Whether users are creating a stand-alone desktop database for personal use, departmental use or for an entire organization, Access offers an easy-to-use database for managing and sharing data. Access 97 brings not only the traditional broad range of easy data management tools but also adds increased integration with the Web for easier sharing of data across a variety of platforms and user levels. [23]

4.2.3 Macromedia Director v7.0

Director 7 allows me to easily combine sound, text and graphics for a true multimedia presentation. Director 7 is not limited to creating web-based presentations though. It is quite capable of creating stand-alone packages that can be distributed on CD-ROM or DVD.

A powerful multimedia tool. Combine realistic graphics, animation, sound and video to deliver a punch and make your audience sit up and take notice. The drag-and-drop features provide simple maneuverablity in the program. The manipulations, rotation, scaling and other tools are handled on the "stage" by cast members, adding to the illusion of creating a movie. Import most file types, including GIFs, animated GIFs, JPGs, Macromedia Flash, Adobe PhotoShop 3 and others. [24]

Shockwave interactions will work with any browser capable of using the Shockwave plug-in. Stand-alone package will only work on the computer system they were built on, so to create a cross-platform CD-ROM, I will need the program on a Mac and a PC.

Lingo is the authoring language for Director 7 that allows you to extend the basic package to create new interactions. I can create quite good material without ever using Lingo instead idea of programming.

4.3 Consideration on Operating System

I was choosing the Windows 98 for EasyAccount system platform that allows PC to work better and play better. Microsoft Windows 98 improves on key areas that keep users waiting on their PCs today, including opening applications faster and shutting down the PC more quickly. In addition, Windows 98 can provide users more disk space through more efficient storage of data on the hard drive.

Windows 98 designed to have updated Windows interface, preemptive 32 bit multitasking, OLE and the 32 bit API set, ability to run 16 bit applications, open system management and secure user profiles for control of access.

Win 98 gives better performance and reliability features include the following:

- Setup enhancements reduce the number of setup steps, allowing for a faster and simplified setup.
- Applications load faster by identifying the most frequently used applications and placing the files associated with their startup together on the user's hard drive so they load quickly.
- More disk space is available as a result of the ability to store information more efficiently with a new feature called FAT32.
- Windows Maintenance Wizard automatically schedules and executes "tune-up" activities to keep users' PCs running in top form.

4.4 Supporting Software

4.4.1 Adobe Photoshop 6.0

Adobe Photoshop 6.0 software introduces the next generation of image editing with powerful new features that offer something for every user. Delivering the broadest and most productive toolset available, Photoshop helps to explore creativity, work at peak efficiency, and achieve the highest quality results across all media.

Adobe Photoshop 6.0 provides integrated tools for creating and outputting crisp, editable vector shapes and text. This tools provides easily combine crisp, resolution-independent type with pixel-based images, and then output sharp type edges with image to produce high-quality results.

Photoshop includes extensive new type formatting controls to produce the best-looking text possible, including the new type-warping that twist and pull type to produce cool effects.[13]

4.4.2 Adobe Premiere 5.1a

Designed for video professionals, Adobe Premiere 5.1a software offers an elegant interface and superb editing tools for producing broadcast-quality movies for video, multimedia, or the Web. Adobe Premiere 5.1a spans the worlds of broadcast and online media helps to develop short- and long-format movies for video, film, multimedia, and the Web. With this cross-platform video editing tool, I can produce professional-quality movies with complete efficiency, control, and flexibility. [16]

4.5 System Modeling Techniques

This section should set out the system model showing the relationships between the system components and the system and its environment. It is probably most appropriate to make use of graphical descriptions of the model in this section.

Data requirements for proposed system should ideally be specified using essential models. Essential models depict the essence of the system (what the system does or must do), independent of how the system will or could be physically implemented.

4.6 Process Design

The primary objective of architecture design is to develop modular program structure and represent the control relationships between module. This means the complex problems are divided into a set of sub-problems that can be solved easily. These partial solutions are then combined to become an overall problem solution. EasyAccount learning package is design based on the structured design. Structured design has its origins in earlier design concepts that stressed on modularity, top-down design and structured programming.

Architecture design is needed when a large system can be decomposed into subsystems that provide some related set of services. Thus, architecture design is the initial design process of identifying these subsystems systems and establishing a framework for subsystems control and communications. Follow is the process design for EasyAccount System in Figure 3.

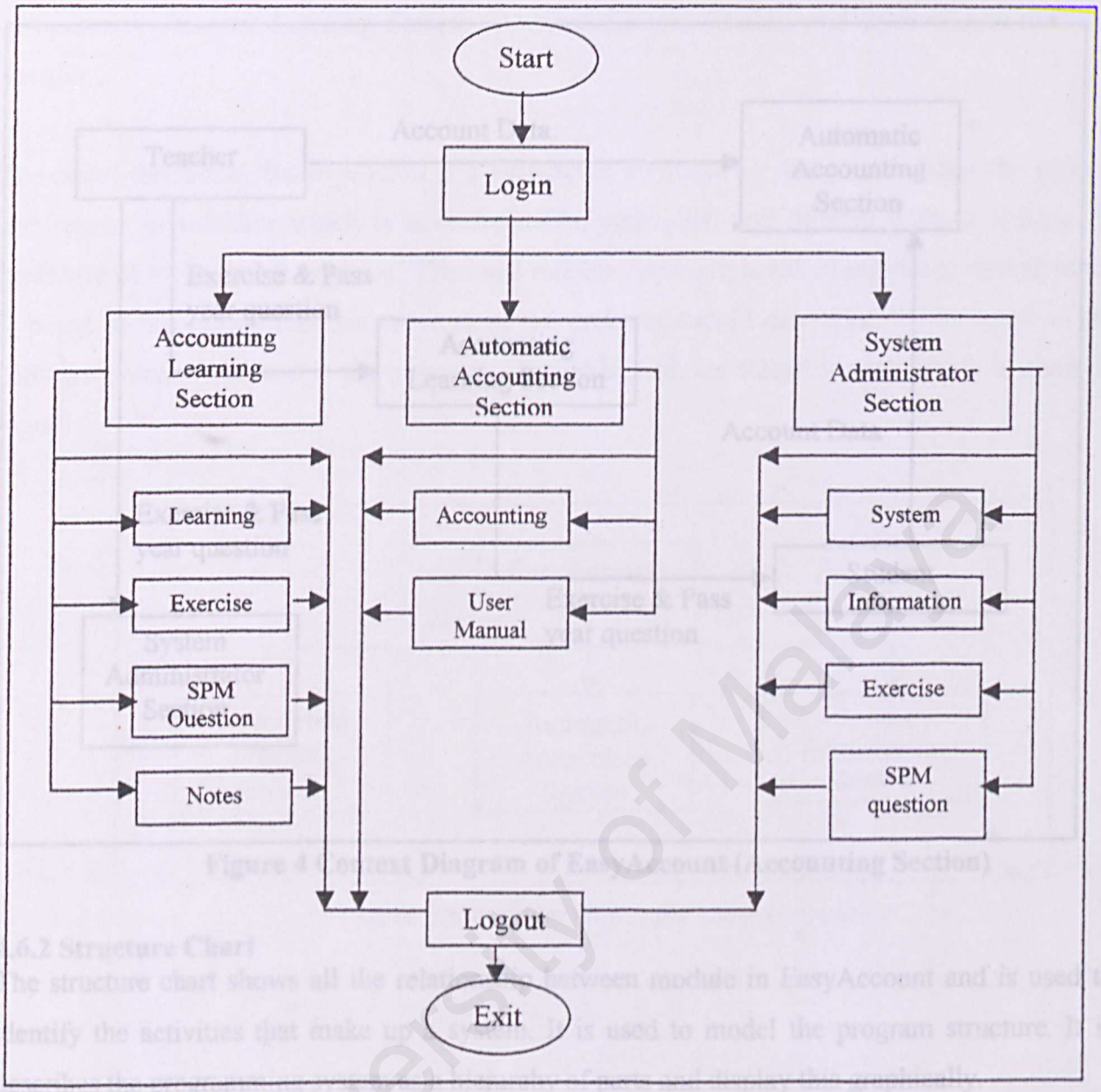

Figure 3 Process Design for EasyAccount System

4.6.1 Context Diagram

The context diagram is drawn showing the entire system as a single process surrounded by the external entities. The major input and output are representation as data flows. The purpose of the context diagram is to furnish an easy overview of the purpose of the whole system [12].

This types of diagram helps to focus on the boundary of the system to be investigated and aids in achieving agreement while the users in defining the scope. EasyAccount's context diagram is show in Figure 4.

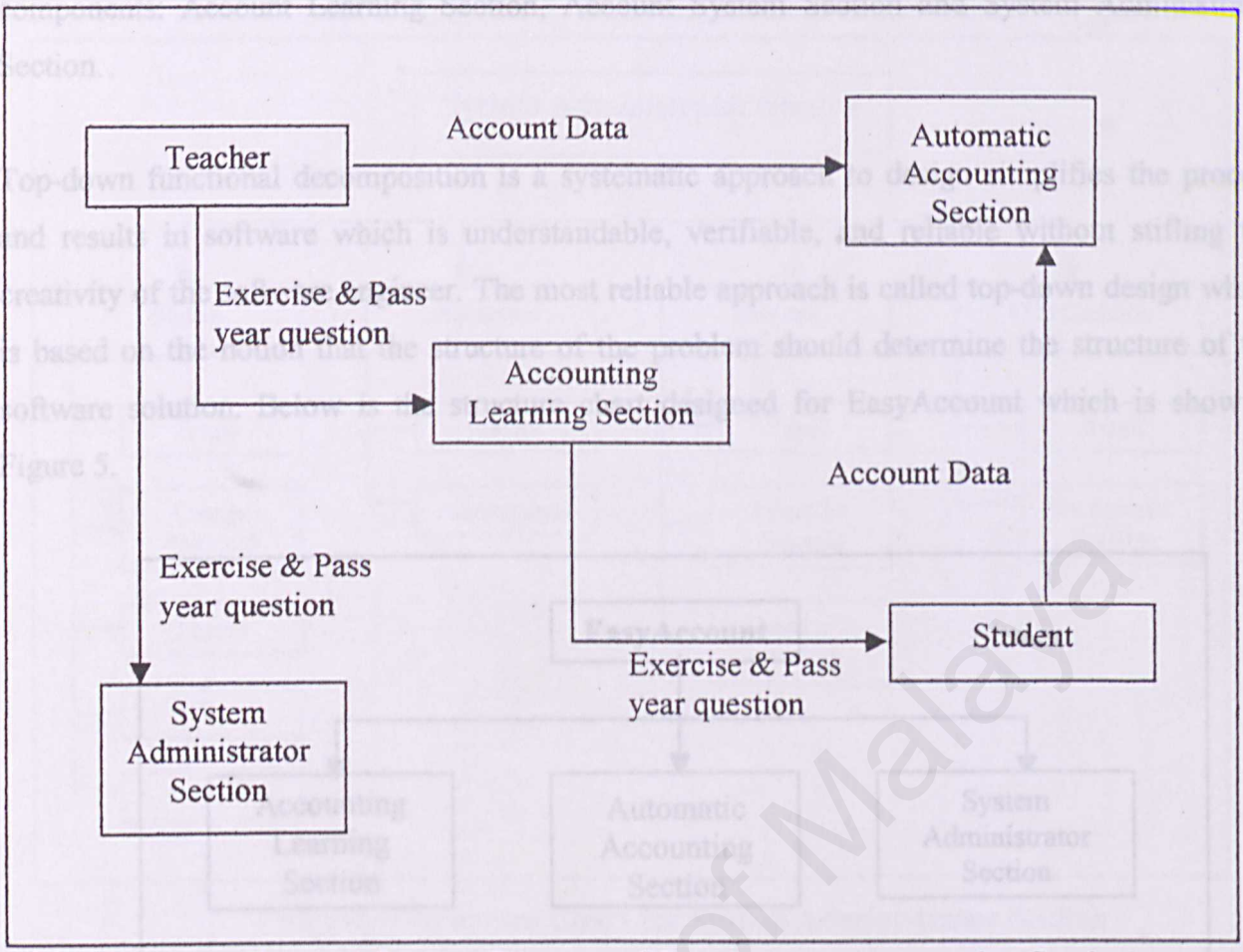

Figure 4 Context Diagram of EasyAccount (Accounting Section)

4.6.2 Structure Chart

The structure chart shows all the relationship between module in EasyAccount and is used to identify the activities that make up a system. It is used to model the program structure. It is describes the programming system as a hierarchy of parts and display this graphically.

Function-oriented design is an approach to software design where the design is decomposed into a set of interacting units which each have a clearly defined function. By comparison with object-oriented design, the design components in this approach are cohesive around a function whereas object-oriented cohesion is around an abstract data entity.

The purpose of a structure chart is to describe the organization of the software showing how components are formed from sub-components. The use of structure chart is to describe the interaction between independent sub-systems. This system is divided into three major

components: Account Learning Section, Account System Section and System Administrator Section.

Top-down functional decomposition is a systematic approach to design simplifies the process and results in software which is understandable, verifiable, and reliable without stifling the creativity of the software engineer. The most reliable approach is called top-down design which is based on the notion that the structure of the problem should determine the structure of the software solution. Below is the structure chart designed for EasyAccount which is show in Figure 5.

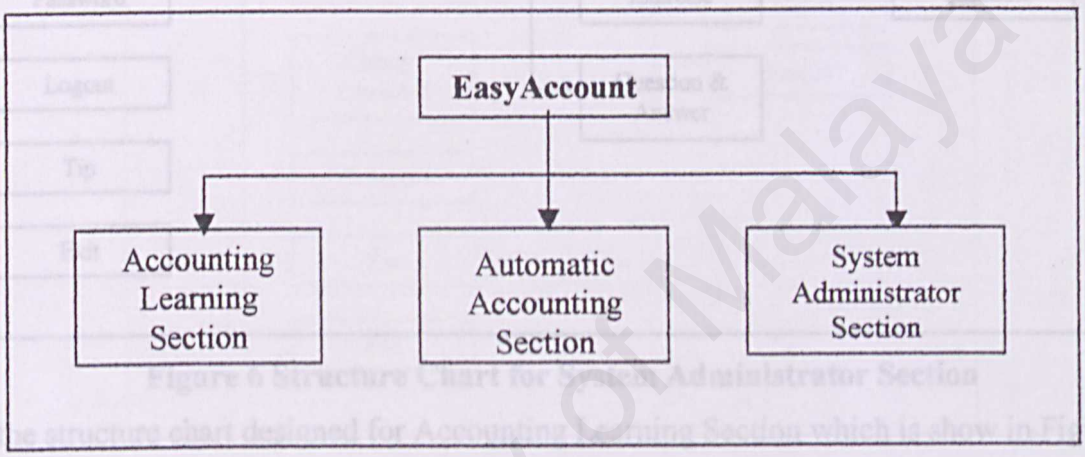

Figure 5 Structure Chart for EasyAccount

Below is the structure chart designed for System Administrator which is show in Figure 6.

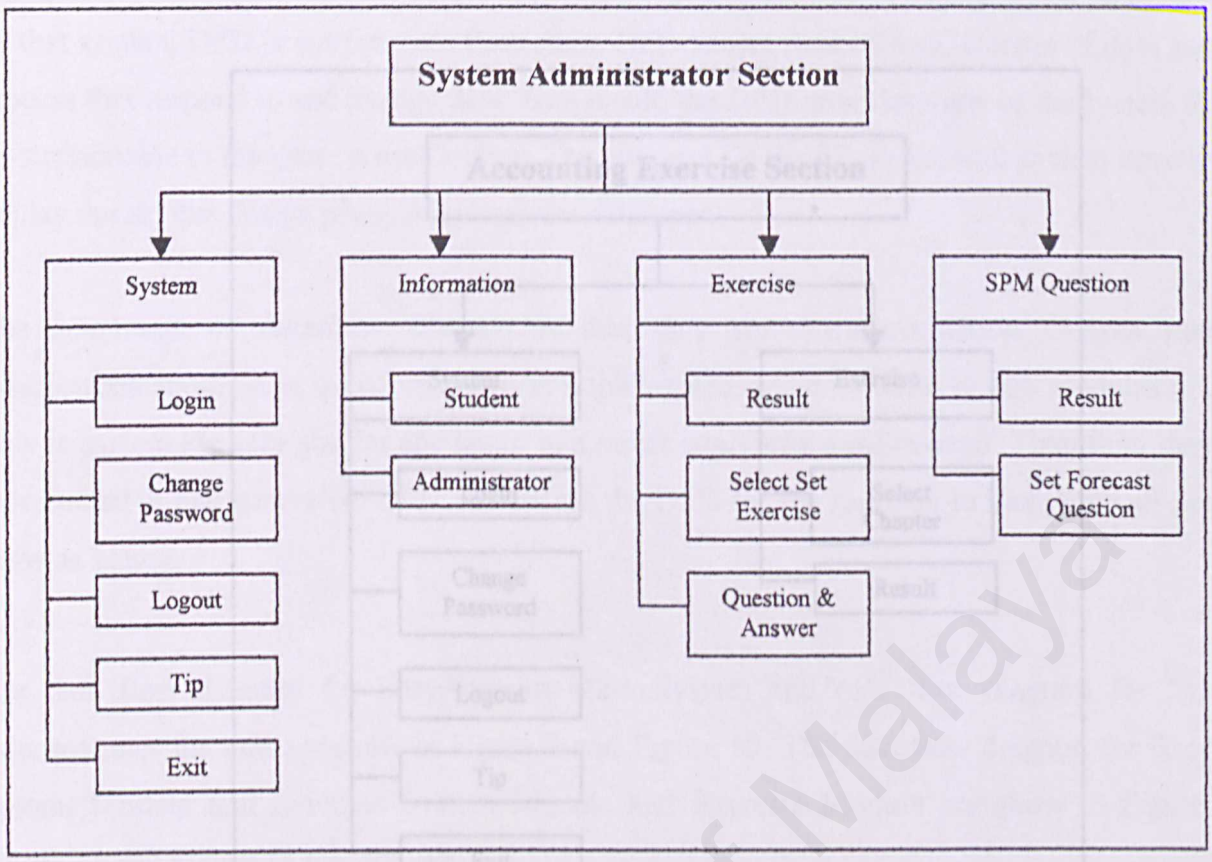

Figure 6 Structure Chart for System Administrator Section

Below is the structure chart designed for Accounting Learning Section which is show in Figure 7.

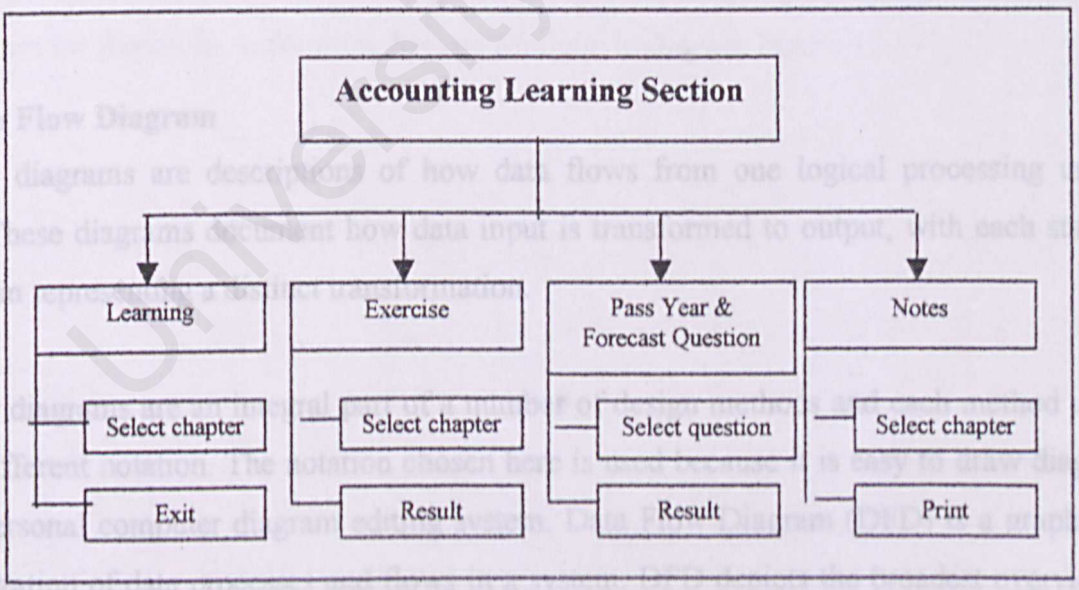

Figure 7 Structure Chart for Accounting Learning Section

Below is the structure chart designed for Account Exercise session which is show in Figure 8.

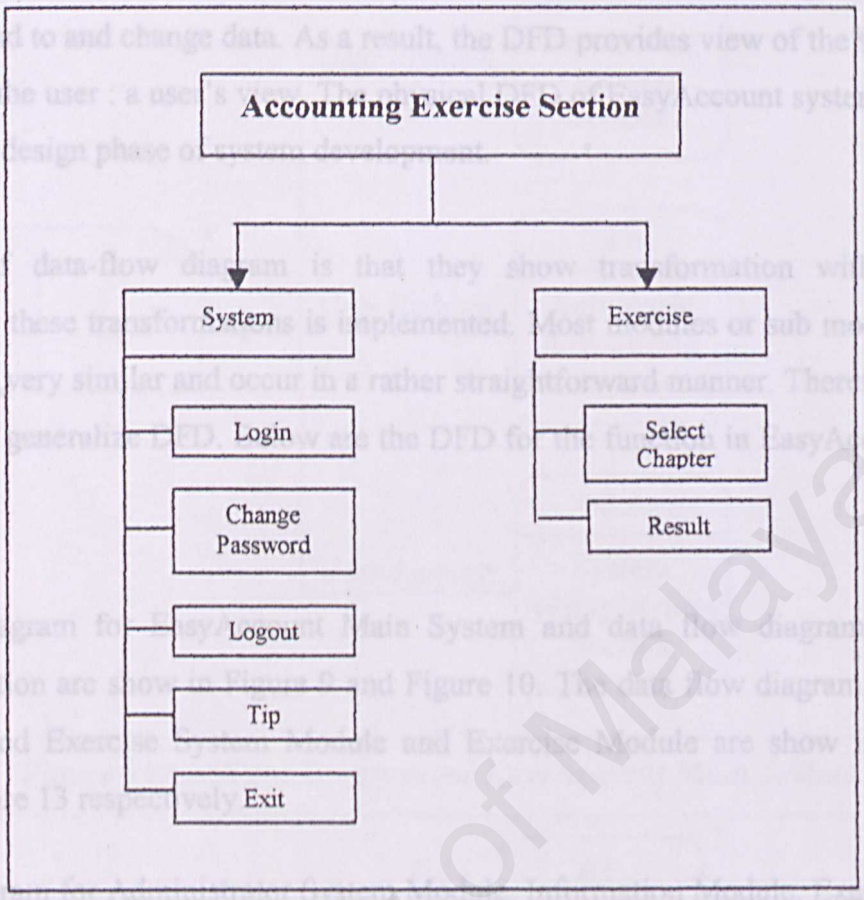

Figure 8 Structure Chart for Exercise Section

4.6.3 Data Flow Diagram

Data-flow diagrams are descriptions of how data flows from one logical processing unit to another. These diagrams document how data input is transformed to output, with each stage in the diagram representing a distinct transformation.

Data-flow diagrams are an integral part of a number of design methods and each method uses a slightly different notation. The notation chosen here is used because it is easy to draw diagrams using a personal computer diagram editing system. Data Flow Diagram (DFD) is a graphically characterization of data processes and flows in a system. DFD depicts the broadest overview of system input, process and outputs, which correspond to data movement through the system.

A physical DFD depicts the flow of data through a system and the work of processing performed by that system. DFD is not program flow chart. DFD shows flow of data, storage of data and the process that respond to and change data. As a result, the DFD provides view of the system that is understandable to the user : a user's view. The physical DFD of EasyAccount system have a role to play during this design phase of system development.

The advantage of data-flow diagram is that they show transformation without making assumptions about these transformations is implemented. Most modules or sub modules of data flow in system are very similar and occur in a rather straightforward manner. Therefore, they are represented in one generalize DFD. Below are the DFD for the function in EasyAccount system show as below.

The data flow diagram for EasyAccount Main System and data flow diagram for System Administrator Section are show in Figure 9 and Figure 10. The data flow diagram for Exercise System Module and Exercise System Module and Exercise Module are show in Figure 11, Figure 12 and Figure 13 respectively.

The data flow diagram for Administrator System Module, Information Module, Exercise Module and SPM Question Module are show in Figure 14, Figure 15, Figure 16 and Figure 17. The data flow diagram for Report in Accounting System Module, is show in Figure 18.

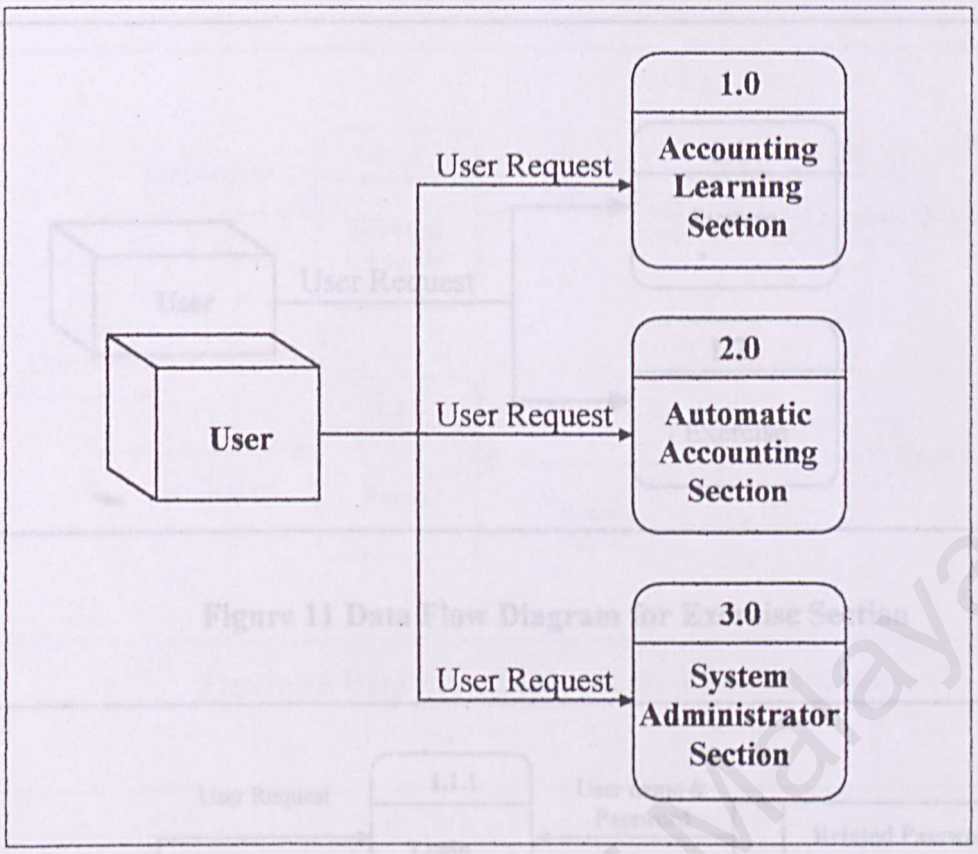

Figure 9 Data Flow Diagram for EasyAccount Main System

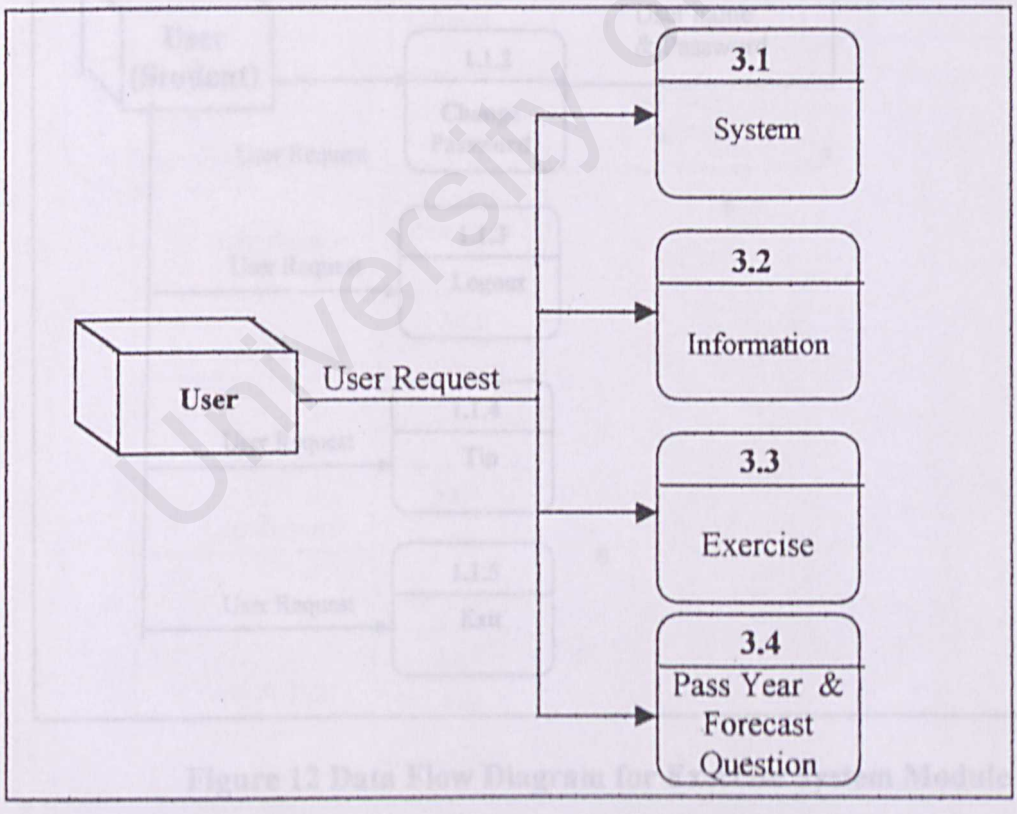

Figure 10 Data Flow Diagram for System Administrator Section

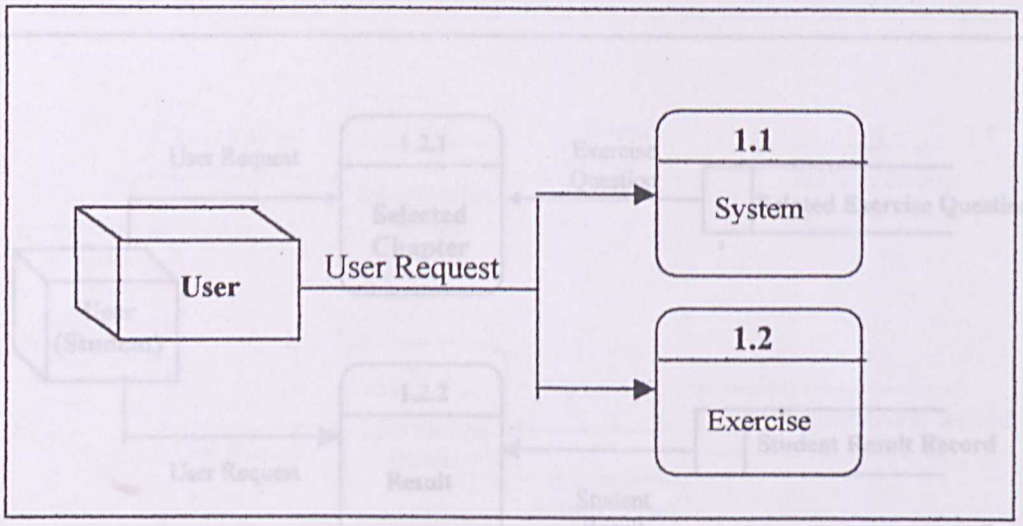

Figure 11 Data Flow Diagram for Exercise Section

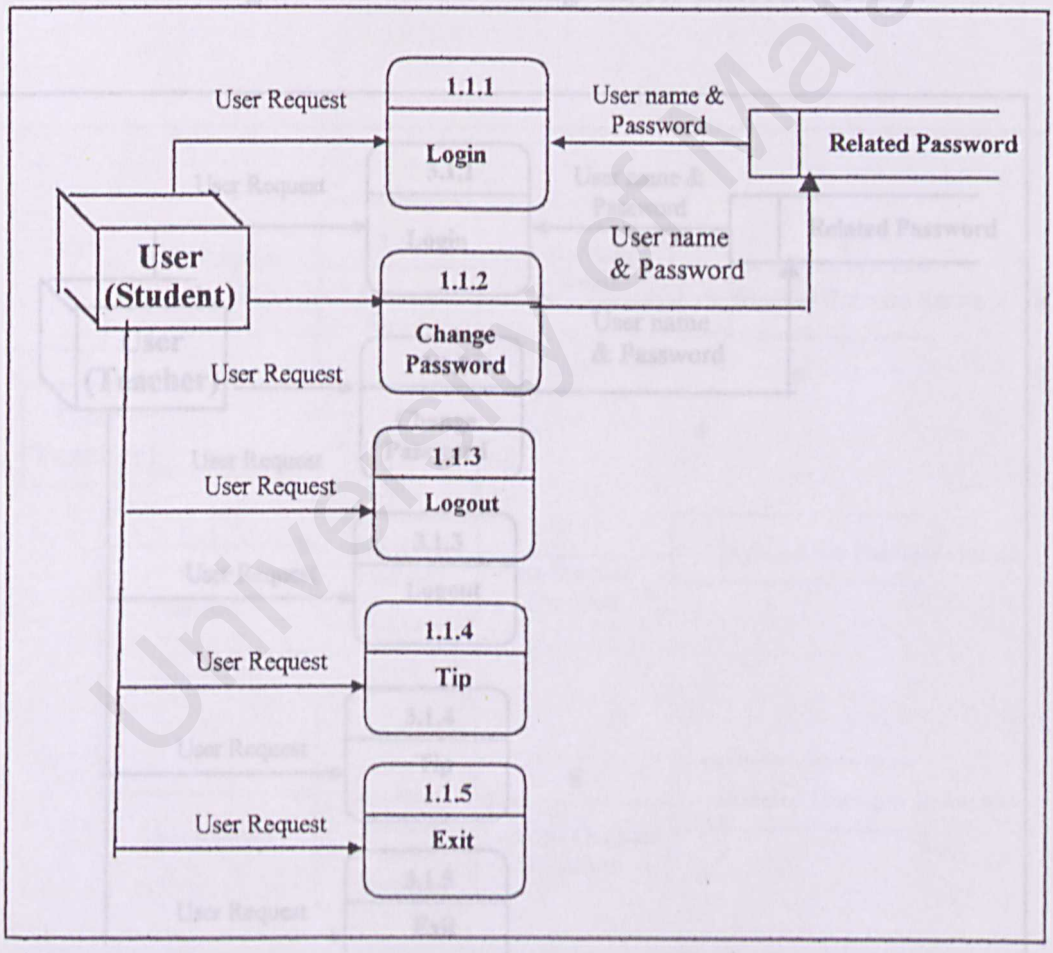

Figure 12 Data Flow Diagram for Exercise System Module

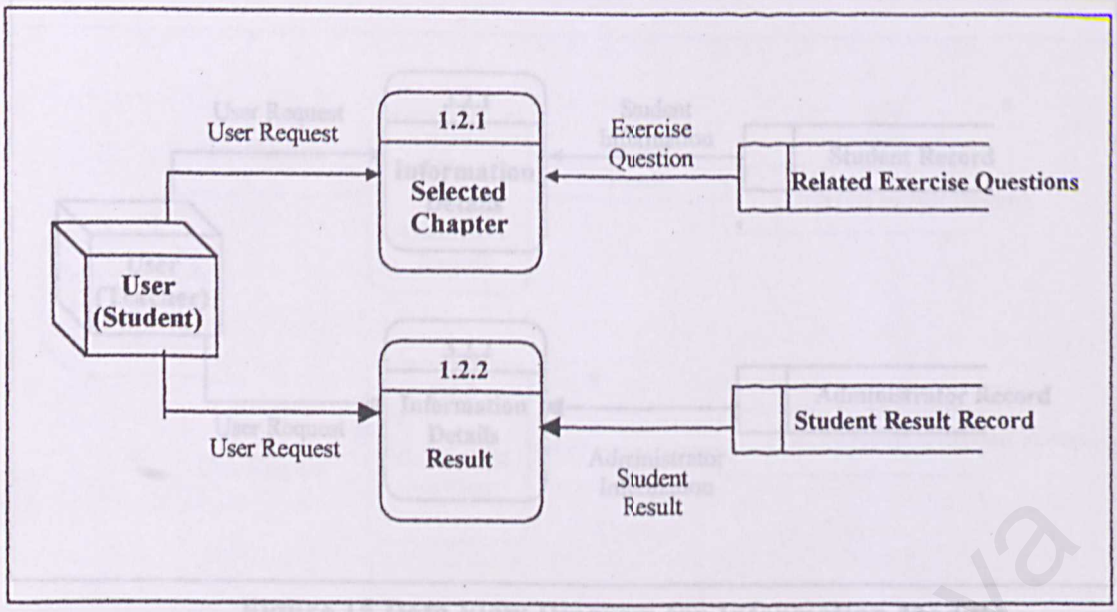

Figure 13 Data Flow Diagram for Exercise Module

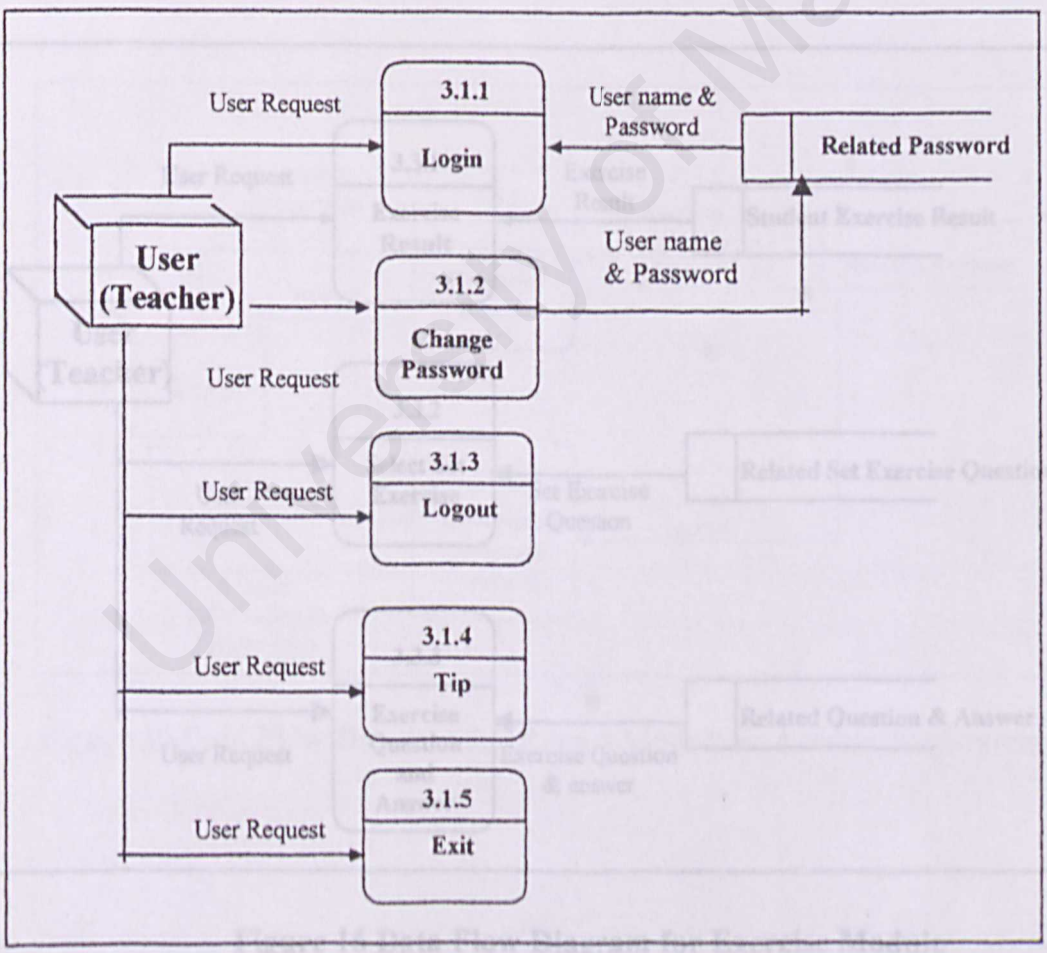

Figure 14 Data Flow Diagram for Administrator System Module

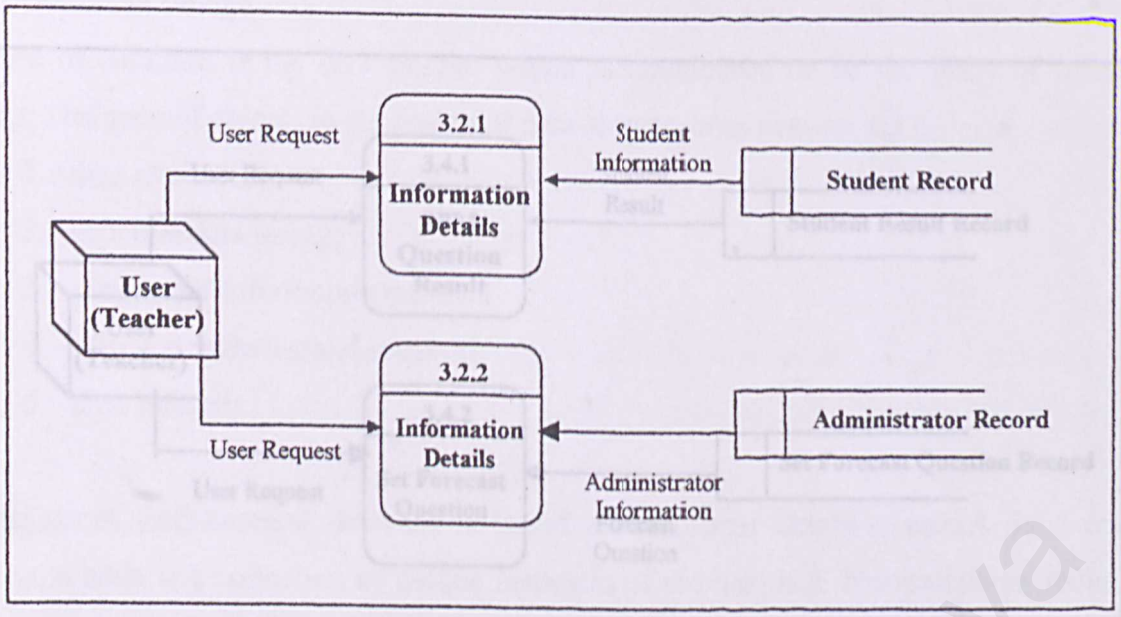

Figure 15 Data Flow Diagram for Information Module

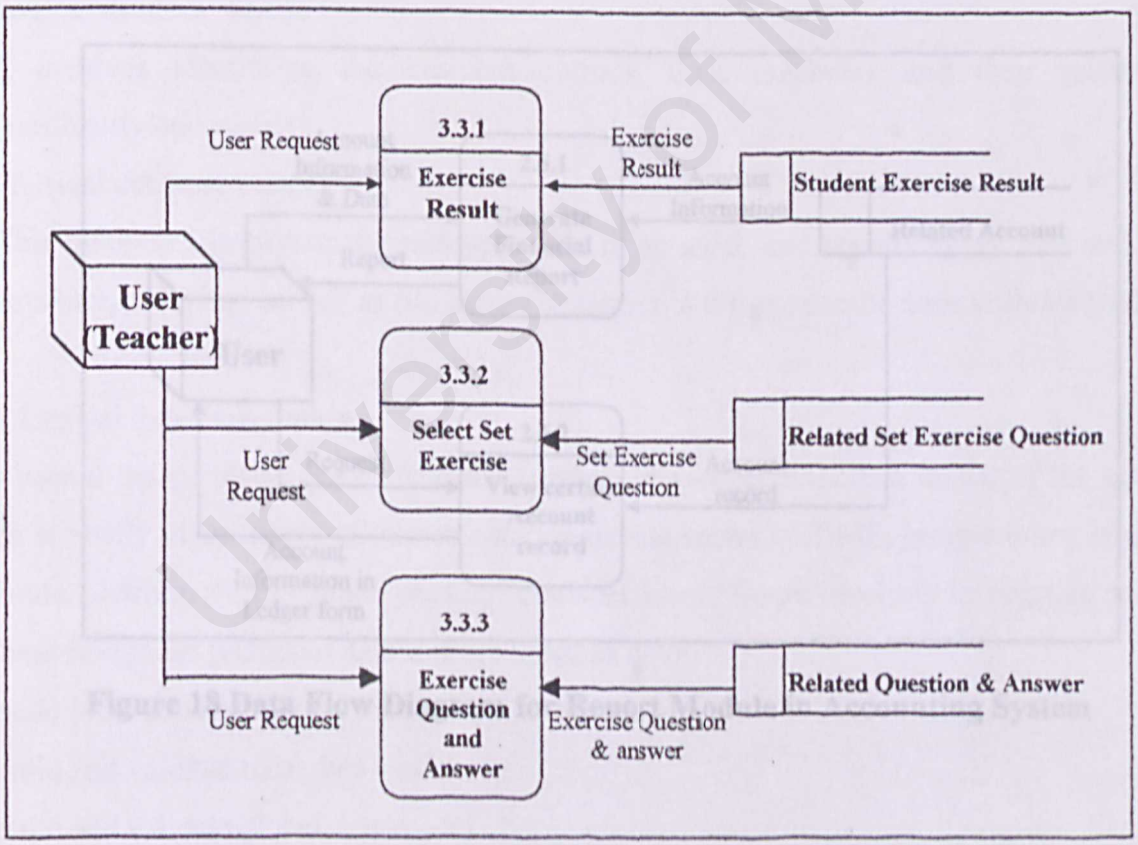

Figure 16 Data Flow Diagram for Exercise Module

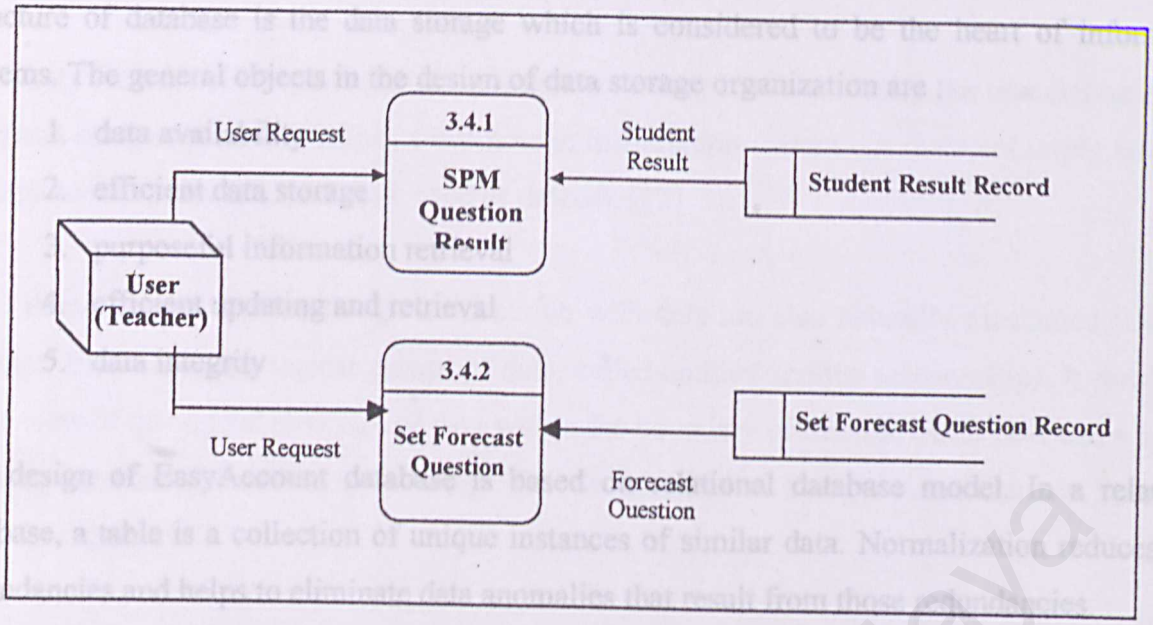

Figure 17 Data Flow Diagram for SPM Question Module

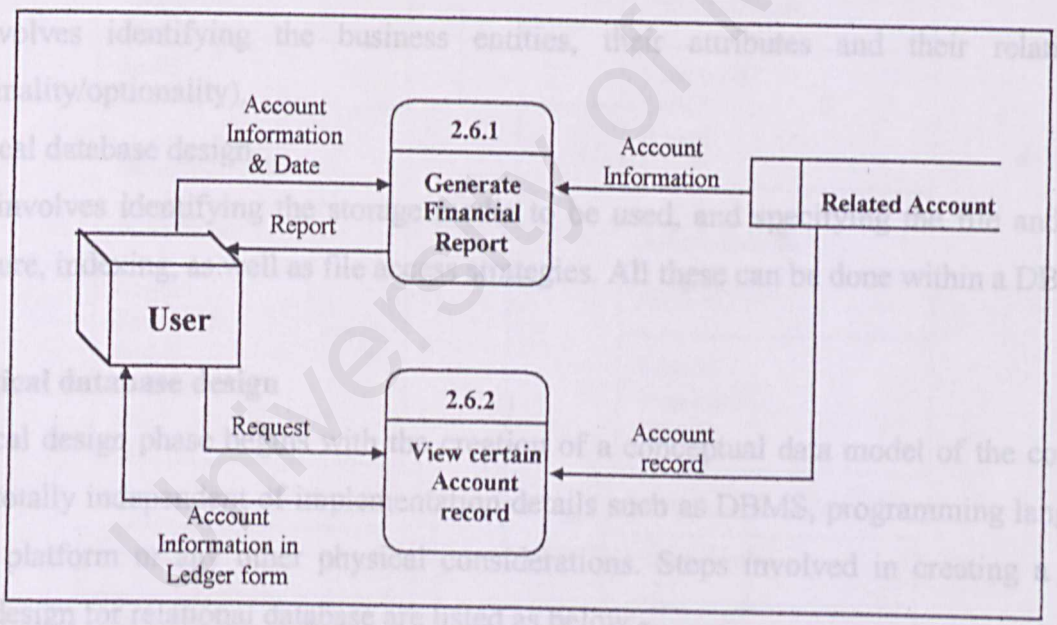

Figure 18 Data Flow Diagram for Report Module in Accounting System

4.7 Database Design

Structure of database is the data storage which is considered to be the heart of information systems. The general objects in the design of data storage organization are :

1. data availability
2. efficient data storage
3. purposeful information retrieval
4. efficient updating and retrieval
5. data integrity

The design of EasyAccount database is based on relational database model. In a relational database, a table is a collection of unique instances of similar data. Normalization reduces data redundancies and helps to eliminate data anomalies that result from those redundancies.

This section is divided into two sections that is:-

a) Logical database design

It involves identifying the business entities, their attributes and their relationships (cardinality/optionality).

b) Physical database design

This involves identifying the storage media to be used, and specifying the file and record structure, indexing, as well as file access strategies. All these can be done within a DBMS.

4.7.1 Logical database design

This logical design phase begins with the creation of a conceptual data model of the company, which is totally independent of implementation details such as DBMS, programming languages, hardware platform or any other physical considerations. Steps involved in creating a logical database design for relational database are listed as below:-

a) build local conceptual data model from user's view

b) build and validate local data model

c) build and validate global data model

Entity Relational Diagram

An Entity Relational Diagram (ERD) is a data modeling tool that depict the association among different categories of data within a business or information system – it does not imply how data is implemented, created, modified, used or deleted. [12]

ERD demonstrates that the things we describe with data are also naturally associated with one another. ERD represent logical groups of data, called entities and the relationships. It provides a clear view of the logical structure of data within the boundary of interest. ERD provides a system view independent of current processing. The actual ERD of System Administrator Section is show in Figure 19.

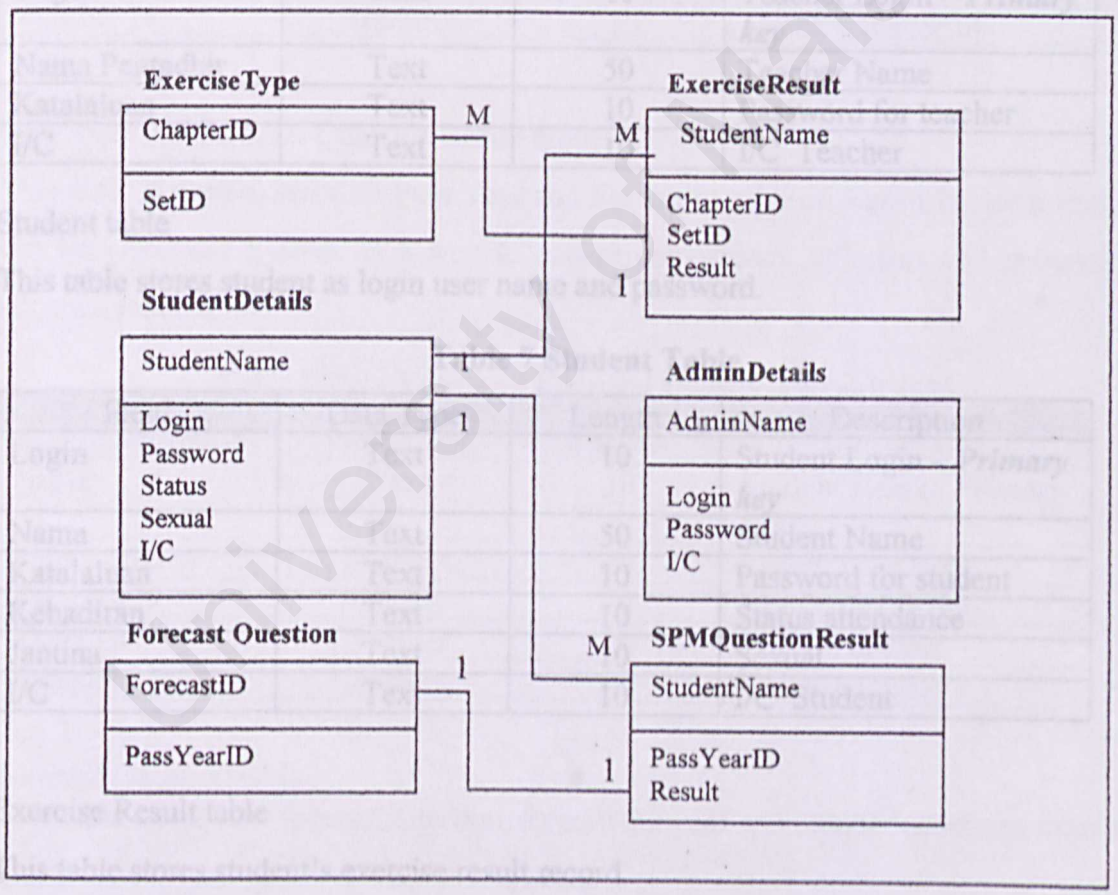

Figure 19 Entity Relationship Diagram for System Administrator Section

4.7.2 Physical database design

Physical database design involves the design of the entity relation diagram as shown in the previous page physically or in other words in a database or table. This database consists of 5 tables for Automatic Accounting Section. Description of each of the table will discuss in the following section. Below are the tables of System Administration Section shown in Figure 6 to Figure 10

1. Teacher table

This table stores teacher as administrator user name and password.

Table 6 Teacher table

Field	Data Type	Length	Description
Login	Text	10	Teacher Login – ***Primary key***
Nama Pentadbir	Text	50	Teacher Name
Katalaluan	Text	10	Password for teacher
I/C	Text	10	I/C Teacher

2. Student table

This table stores student as login user name and password.

Table 7 Student Table

Field	Data Type	Length	Description
Login	Text	10	Student Login – ***Primary key***
Nama	Text	50	Student Name
Katalaluan	Text	10	Password for student
Kehadiran	Text	10	Status attendance
Jantina	Text	10	Sexual
I/C	Text	10	I/C Student

3. Exercise Result table

This table stores student's exercise result record.

Table 8 Exercise Result Table

Field	Data Type	Length	Description
Nama	Text	10	Student Name– ***Primary key***
Latihan 1	Number	10	Result Chapter 1
Latihan 2	Number	10	Result Chapter 2
Latihan 3	Number	10	Result Chapter 3
Latihan 4	Number	10	Result Chapter 4
Latihan 5	Number	10	Result Chapter 5
Latihan 6	Number	10	Result Chapter 6
Latihan 7	Number	10	Result Chapter 7
Latihan 8	Number	10	Result Chapter 8
Latihan 9	Number	10	Result Chapter 9
Latihan 10	Number	10	Result Chapter 10
Latihan 11	Number	10	Result Chapter 11
Latihan 12	Number	10	Result Chapter 12
Latihan 13	Number	10	Result Chapter 13
Latihan 14	Number	10	Result Chapter 14

4. Pass Year and Forecast Question Result table

This table is used to store all Pass Year and Forecast Question Result for each student in the EasyAccount System as a way to ensure consistency of result and generating of accurate reports.

Table 9 Pass Year and Forecast Question Result table

Field	Data Type	Length	Description
Nama	Text	10	Student Name– ***Primary key***
Tahun1998	Number	10	Result Year 1998
Tahun1999	Number	10	Result Year 1999
Ramalan	Number	10	Result Forecast
Ramalan2	Number	10	Result Forecast 2

5. Forecast Question table

This table stores new forecast question. Record the year and number questions from 1998 year and 1999 year and 1 set forrecast question.

Table 10 Quiz Question table

Field	Data Type	Length	Description
Soalan	Text	50	Pass year question – ***Primary key***
Ramalan2	Text	50	Selected Year of Pass year and question

4.8 Interface Design

The user interface is the mechanism through which a dialogue between the program and the human is established. The design of a good computer interface takes into accounts the needs, experience and skill level of the users.

User interface establishes the layout and interaction mechanisms for human-machine interaction. The four objects of user interface design efficiency, effectiveness, user consideration and productivity. The user interface design help users gain rapid access to the content of complex systems, without losing their comprehension as they move through information. [4]

4.8.1 Functional design

The user interface in EasyAccount system is based on the graphical user interface (GUI). The GUI user menus (full-down menu), pop-up windows (dialogue box) and scroll bars. The menus are EasyAccount system is put aside until the user wants to employ them.

System functionality design is based on the system requirements and the hierarchical chart stated in Chapter 3. It translates the system requirements into system functionality. This construction is based on assigning functions to components. A high-level description of the functions that are to be implemented and build lower-level explanations of how each component will be organized and related to other components. Each identified component is decomposed into module/functions.

Below is the object of input and output design for a system shows in Table 11.

Table 11 Object of Input Design

Input design	Output design
Ease of use	Choose effective output method
Effectiveness	Assure purpose output
Accuracy	Make meaningful to user
Simplicity	Provide appropriate quantity
Attractiveness	Provide appropriate distribution
Consistency	Assure timeliness

Below are the content design for the System Administrator Section, which is a functionally design for the System Administrator Section show in Figure 20 to Figure 25.

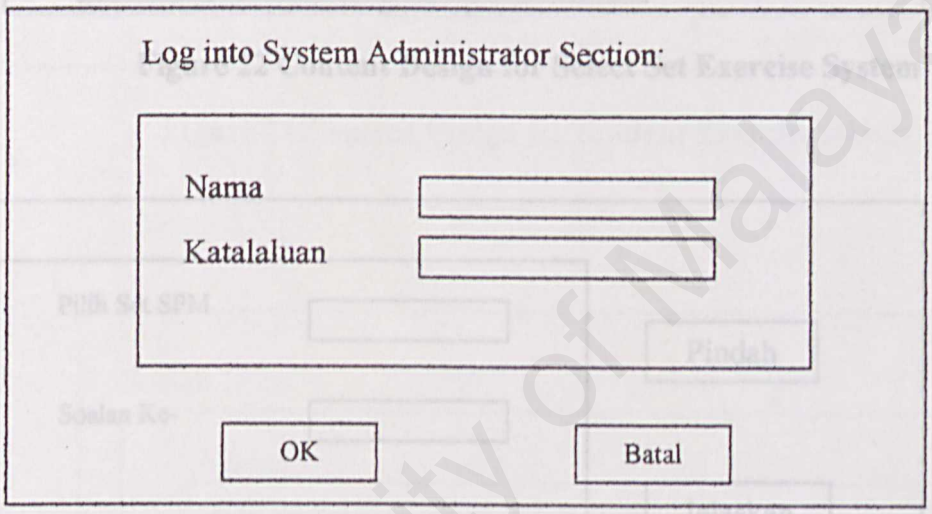

Figure 20 Content Design for Administrator Login

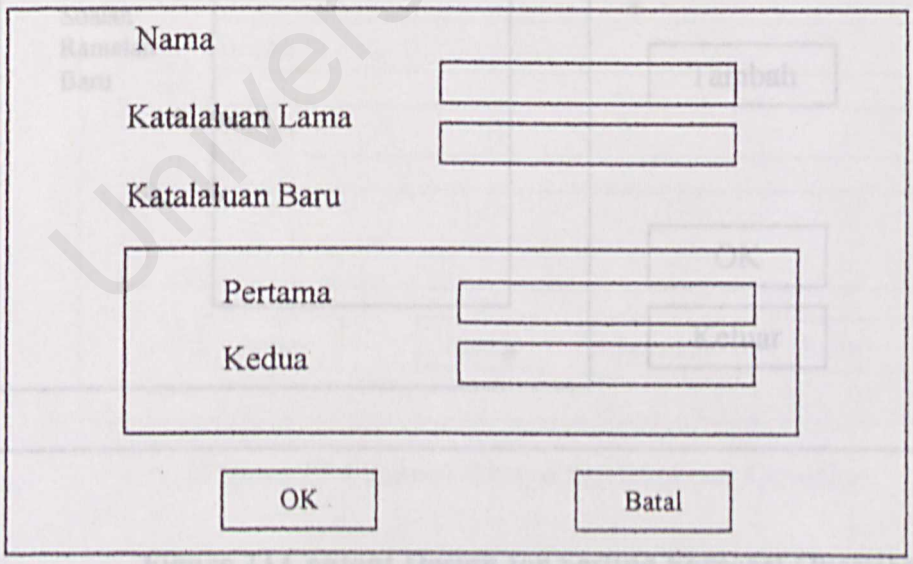

Figure 21 Content Design for Student Change Password

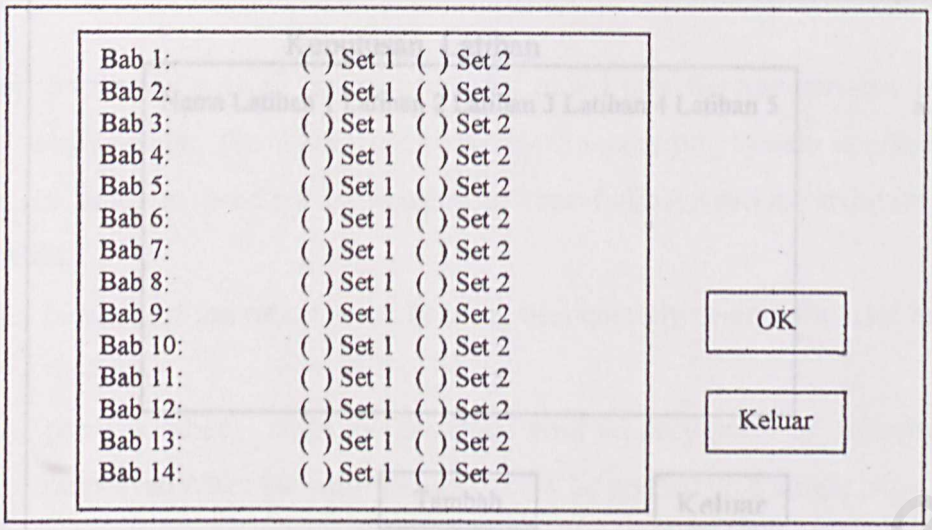

Figure 22 Content Design for Select Set Exercise System

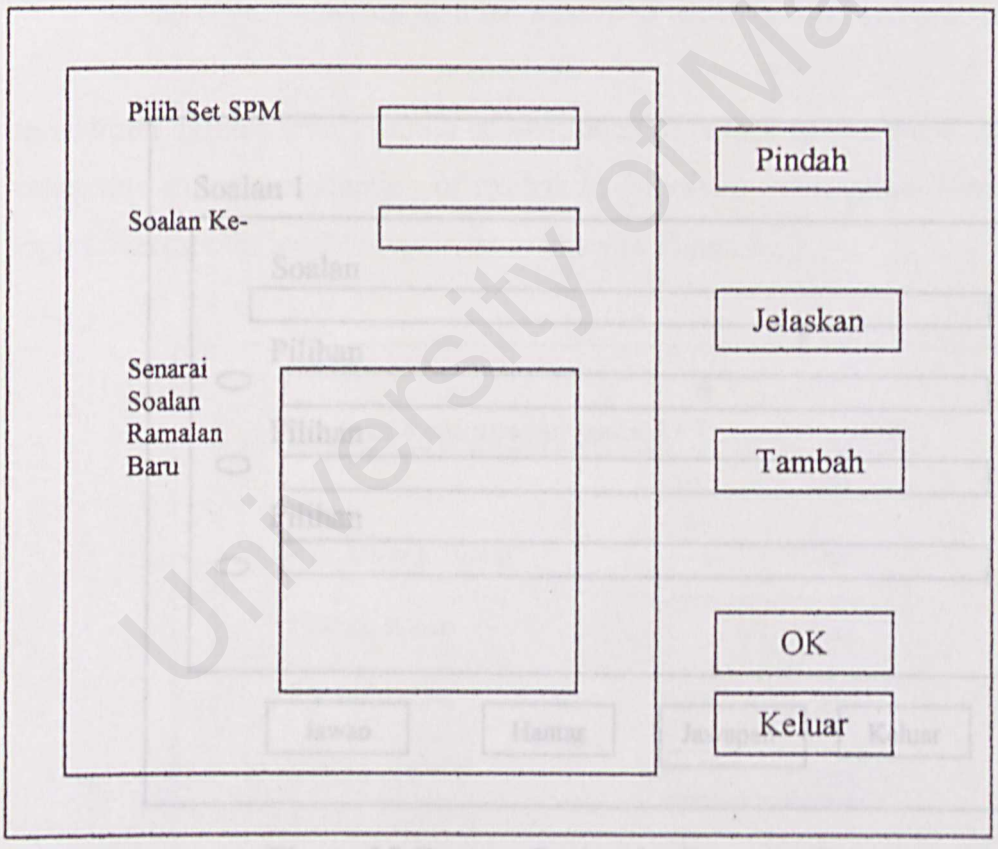

Figure 23 Content Design for Setting Forecast Question

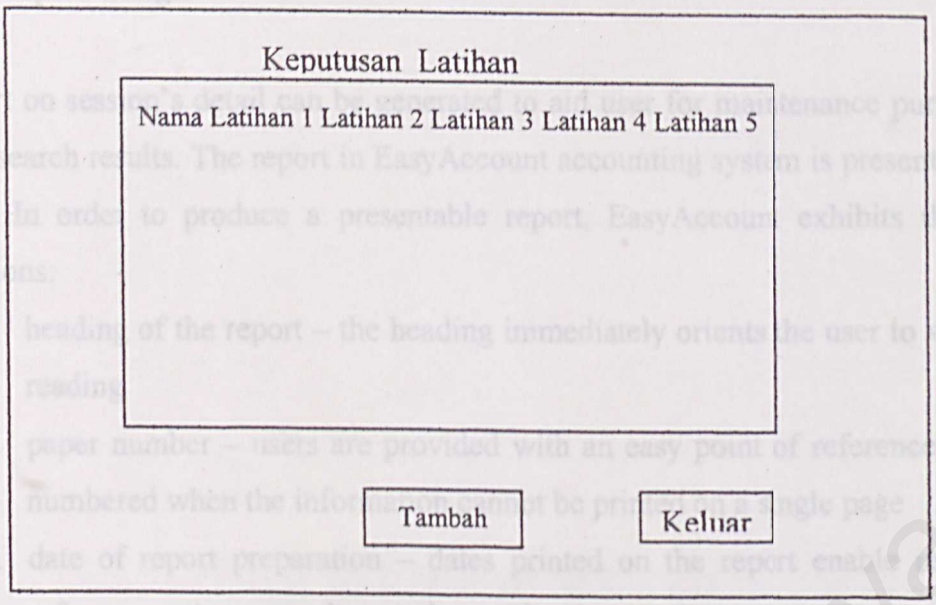

Figure 24 Content Design for Student Exercise Result

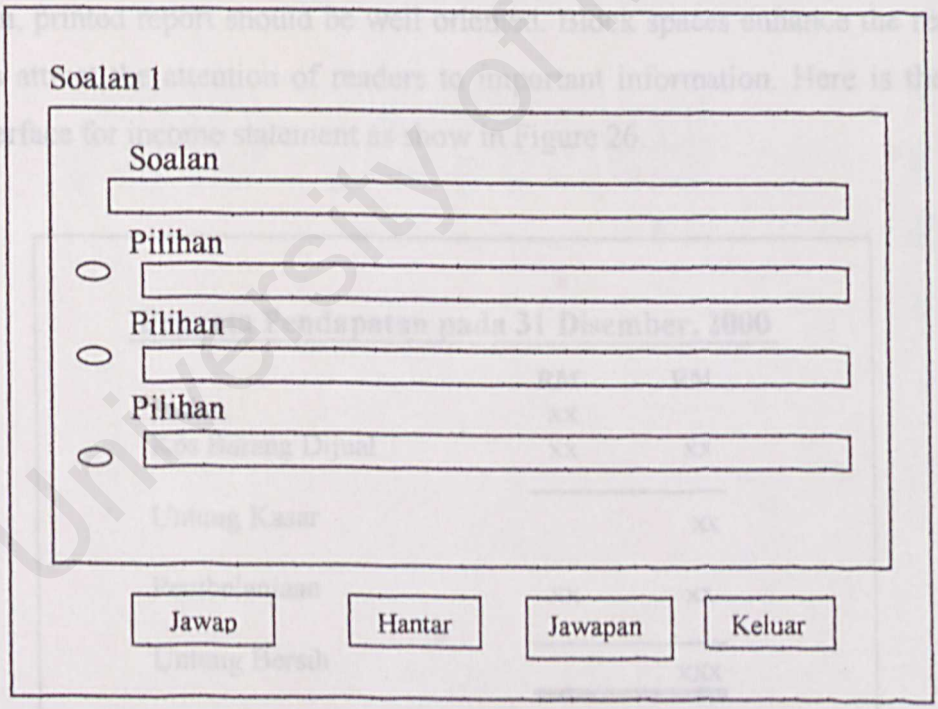

Figure 25 Content Design for Exercise Question

4.8.2 Report design

Report on session's detail can be generated to aid user for maintenance purposes and to view search results. The report in EasyAccount accounting system is presented in tabular form. In order to produce a presentable report, EasyAccount exhibits the following functions:

1. heading of the report – the heading immediately orients the user to what they are reading
2. paper number – users are provided with an easy point of reference if pages are numbered when the information cannot be printed on a single page
3. date of report preparation – dates printed on the report enable users to make references when records were last updated
4. column heading - column heading serve to further orient the user to the contents of the table. Each data item has a heading which is short and precise.

In addition, printed report should be well oriented. Block spaces enhance the readability characters attract the attention of readers to important information. Here is the sample report interface for income statement as show in Figure 26.

Penyata Pendapatan pada 31 Disember, 2000

	RM	RM
Jualan	xx	
Kos Barang Dijual	xx	xx
Untung Kasar		xx
Pembelanjaan	xx	xx
Untung Bersih		xxx

Figure 26 Content Design for Income statement Report

CHAPTER 5
IMPLEMENTATION AND TESTING

Chapter 5 Implementation and Testing

5.0 Introduction

This section is about the development strategy used as well as the type of implementations for the whole package. This phase at times involves some modifications on database and design to the previous chapter.

The coding used in the package will also be discussed and finally, the files required in the user system. System implementation and testing is the following phase after system design. System implementation is a process that converts the system requirements and design into program codes. Testing is performed to ensure that the programs are executed correctly and conforms to the requirements specified. This chapter will discuss about coding and testing method used during the development of this system.

This chapter covers the principles of implementing and verifying computer software. Implementation topics include coding style, packaging principles, reuse, testability, and maintainability.[31]

5.1 Development Strategy

Since this package is about multimedia learning, prototyping model should be used. Below are the reasons why prototyping was used:

- Easily change the system should any problem encountered
- The user interface used could well reflect the user needs
- Able to find any missing function or requirements.
- Since this package is almost the same, prototyping could be used as a template for other implementations.

5.1.1 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware and software not only will not help to speed up the system development, but also determine the success of the project. The hardware and software tools used to develop the entire system are listed in the following section.

5.1.1.1 Hardware Requirement

The hardware used to develop the system are listed as below:

- Intel Pentium 166MMX
- 32MB EDO RAM
- 10.5 GB Hard Disk
- other standard computer peripherals

5.1.1.2 Software Requirement

There are a lot of software tools, which are used in designing and writing report. The design process involves the drawing of structure chart, Entity-Relationship diagram and others that from the foundation of the software development. During the course of EasyAccount development, a vast array of software tools was used.

5.1.2 Development Tools

The various tools are used for development include those meant for:

1) Operating System - Windows 98
2) Program coding - Microsoft Visual Basic 6.0
3) Multimedia presentation - Macromedia Director 7.0 (Lingo)
4) Database Implementation - Microsoft Access 97
5) Graphical Editor and Sound Editor - Adobe Photoshop 5.0 and Cold Edit 2000
6) Documentation - Microsoft Word 97, Microsoft PowerPoint 97, and Visio Technical 3.0

Tables as below depict the software used to develop the EasyAccount system.

5.1.2.1 Operating System

The following Table 12 is stated the Operating System for EasyAccount system requirement:

Table 12 Operating Used and Purpose

Operating System	Purpose
Windows 98	To be a platform to develop when using Visual Basic 6.0 and Microsoft Access 97

5.1.2.2 Program Coding Tool

The following Table 13 is stated the programming coding tools for EasyAccount system development:

Table 13 Program Coding Tool Used

Tool	Purpose
Standard Module in Microsoft Visual Basic 6.0	To create coding for the whole project's (including the Accounting System Section, Administrator System Section, Exercise Section and Pass Year Question Section) functions include connection to database functions, calculation functions, retrieve data from database and display the data functions and SQL execution function

5.1.2.3 Multimedia Presentation Tool

Table 14 stated tools used to create movie for the development of Accounting Learning Section.

Table 14 Multimedia Presentation Tool Used

Tool	Purpose
Macromedia Director 7.0	To create coding for the Accounting Learning Section's functions as scripting on cast member, sprite and marker.

5.1.2.4 Database Implementation Tool

Table 15 stated tools used to develop database for Administrator System Section to build the database to store and manipulate the data.

Table 15 Database Implementation Tool Used

Tool	Purpose
Microsoft Access 97	♦ To build database structure ♦ To keep information of available PC failure symptoms ♦ To keep student record and administrator record ♦ To keep student exercise, and pass year and forecast question result ♦ To keep possible new forecast questions ♦ To keep selection set of exercises

5.1.2.5 Graphical Editor and Sound Editor Tools

Table 16 stated graphical editor tools used to design and create image for interactive user interface, and sound editor tool for multimedia presentation in Accounting Learning Section.

Table 16 Graphical Editor and Sound Editor Tools Used

Tool	Purpose
Adobe Photoshop 5.0	To create and refine graphic file
Accessory Paint	To create and refine graphic file
Cold Edit 2000	To record and edit sound file

5.1.2.6 Documentation Tool

Table 17 stated tools used to create document and graphic for EasyAccount package.

Table 17 Documentation Tool Used

Tool	Purpose
Microsoft Word 97	To write account notes, question and answer, report and user manual.
Microsoft PowerPoint 97	To draw chart for import into Director
Visio Technical 3.0	To draw Data Flow Diagram(DFD) and Entity-Relationship Diagram (ERD)
Pad	To write the ReadMe file for user.

5.2 Database Connection Development

ActiveX Data Object (ADO) is used to store and retrieve data from a database. Before ADO can be used, a data source must be created. A data source contains information about how to connect to a data provider. This system uses data source to connect to Microsoft Access.

All communication with a database takes places through an open connection. Before any information can be inserted into or retrieved from a database, a connection with the database must be opened. Below are a few steps to follow in order to open a database connection.

a) Create an instance of the database connection to open a connection with the database.

b) Call the open method of the connection object to actually open the database.

5.3 Modules Implementation

The EasyAccount system is divided into three main modules, which are the Accounting System module, Accounting Learning module and Administrator System module. Each module is developed using Visual Basic. The following sections explain the details about the implementation of each module throughout the project.

5.3.1 Accounting System module

This module is developed especially for student.

5.3.1.1 System Module

This module consists of several sub-modules, which are Chart of Account sub-module, Daily Transaction sub-module, Opening Entry sub-module, Debtor sub-module, Creditor sub-module, report sub-module and Help sub-module.

The module is developed using the database is connected to the ODBC data source (32-bit) in Control Panel. All the transaction result is updated to database.

5.3.1.2 How to use the system Module

The module provides the student with the knowledge of using this accounting system.

5.3.2 Accounting Learning module

This module is developed for student.

5.3.2.1 Authentication Logon

This module was implemented to verify the login ID and password entered by the student where needed in Exercise module, and Pass Year and Forecast Question module.

5.3.2.2 System Module

This module consists of several sub-modules, which are Change Password sub-module, Logout sub-module, Tips and Exit.

5.3.2.3 Exercise Module

This module consists of several sub-modules, which are Select Chapter sub-module and Result sub-module. The Select Chapter sub-module provides only one set exercise that selected in the administrator module.

The module is developed using the database is connected to the ODBC data source (32-bit) in Control Panel. The student's exercise result is updated to database.

5.3.2.4 Pass Year Question and Forecast Question module

This module provides some existing pass year question and forecast question, and may also together with the new created forecast question.

The module is developed by using the database is connected to the ODBC data source (32-bit) in Control Panel. The student's set question result is updated to database.

5.3.3 System Administrator module

All the modules below are developed by using the database is connected to the ODBC data source (32-bit) in Control Panel. This module is developed for teacher.

5.4 Coding Approach

EasyAccount was developed modularity by using the event-oriented approach, which involves building the software modules according to the event functions.

EasyAccount multimedia presentation module was developed first. This was followed by refined the user interface and developed the exercise, question and administrator modules. Finally, EasyAccount's data was captured in the database.

5.4.1 Macromedia Director 7.0

The scripting engine in Macromedia Director is Lingo, which is useful in implementing the various jumping in the package. The jumping here means that the package is divided into smaller files and the communication from one file to and another file is through jumping. This is actually calling another file and the presentation will continue from there.

This type of jumping was implemented because this will make the file smaller as well as execution in a subject in a same file. Table showing the main control used in EasyAccount:

Table 18 Director 7.0 Control Used in EasyAccount Development

Control	Description
Marker	Indicate certain sections of movies which are located so Director can navigate to those sections.
Keyframes	Create animations.
Paint	For creating and editing graphics
Lingo script	Describe an action, creating rich

5.4.2 Microsoft Visual Basic 6.0

Microsoft Visual Basic is the fastest and easiest way to create applications for Microsoft Windows. Visual Basic provides a complete set of tools to simply rapid application development.

EasyAccount program was developed with the Standard Execute module of Microsoft Visual Basic 6.0. Each unit was a Visual Basic Form and has an extension of .frm. All forms were stored in a Visual Basic Project, call Latihan.vbp, Admin Section.vbp and Pakej.vbp.

5.4.2.1 Event-Driven Programming

Visual Basic is an event-driven programming language. Event-driven program is a process of writing programs that respond to triggered events, as opposed to older and followed a pre-determined flow. In an event programming environment, each user interaction – such as a mouse

click or a keystroke – is known as an event. Here is the sample of the code for the event-driven program:

```
Sub Private cmdSeterus_Click()
    :
End Sub
```

An event-driven program would respond to movements of a mouse and clicks and should respond differently program provide almost immediate feedback to the user and allow the user great control over the activity of the program.

The following explains positive of using Visual Basic:

1) Easier way to create Window application

   Visual Basic is a visual programming language, which enables the developer to rapidly create a window-based application. Although it is not a pure Object-Oriented Programming Language (OOPL), it lead itself to the OOP concept by offering a set of predefined objects such as command buttons, text field, option boxes, list boxes etc. That can be added to a program by dragging and dropping them place on screen. There are also custom took concepts such as extensibility, reusability and made them work in a concrete way. [31] Therefore, it was took me by the hand and got me quickly up to speed.

2) Easier to learn

   The code written in Visual Basic is easy to read, to write and to understand. The structure is understandable with its command in simple English.

3) Support database connectivity

The objects can add richly to a user interface. A list box offers a set of alternatives, it's far more user-friendly than requiring the user to guess what the valid entries are. Another way of offering a set of choices is with a group of option buttons. [30]

Table 19 A List Control of Visual Basic Used in EasyAccount Development

Object	Control	Description
	ADODC data control (ADODC)	To provide a connection to database
	Check box control (CheckBox)	To provide a simple yes/no selection mechanism.
	Combo box control (ComboBox)	To provide three variations on the standard list box. None of these support multiple selection.
	Command button control (CommandButton)	It is a standard control for providing a direct command, such as OK or Cancel.
	Data grid control (DataGrid)	To provide an data table as display result and personal details.
	Frame control (Frame)	To provides a mechanism for grouping other controls. This can be for visual clarity, grouping option buttons, or creating a group of controls that can be easily moved as a unit.
	(ImageList)	To provide a list of image to toolbar.
	Lightweight image control (Image)	To provide a simple bitmap image to place in the background graphics of its container (form, picture box, or frame).
	Label control (Label)	To provide a one-line, non-editable description, which is useful for labeling other controls that do not have their own built-in label.
	Line drawing control (Line)	To provide an easy way to draw lines in the background graphics of a form, picture box, or frame at design time.
	OLE container control (OLE)	It is enable to place data from another application (Microsoft Word, Excel) into a Visual Basic form.
	Option button control (OptionButton)	To indicate a selection from two or more alternatives.
	Picture box control (PictureBox)	To provides a graphical area with maximum fleibility.
	Shape drawing control (Shape)	To provide an easy of creating background graphics (rectangle, square, circle, or oval) of a form, picture box, or frame at design time.
	(SSTab)	To provide an easy way to display similar interface
	Text box control (TextBox)	To provide a standard Windows text box. The user can enter and edit in this control.
	Tool bar control (Toolbar)	To provide a comprised of pictures calls icons that represent commands

5.4.2.3 Project Code Format

Nearly all Visual Basic application code is concerned, directly or indirectly, with responding to events. To write an event procedure for an object, start by double-clicking it; this brings up the Code window. Next, use the two list boxes at the top of the Code Window to navigate to different objects and events as needed. [30]

But, it is very tedious and time-consuming in this text and data capture on the exercise and marks calculation.

Code will be assessed on layout, organisation, efficiency, portability, comments, its completion and usability. [33]

(A) Identifier Names

1. Module prefix is used on all exported identifiers and on no others.
2. Naming is mnemonic and consistent.
3. Option Explicit statement are no arguments or optional syntax. All variables must be declared with statements such as Dim, Public, and Private. [30]

(B) Coding Style

1. *Whitespace*. Generally: minimize vertical and horizontal whitespace.
   - Following the last global declaration.
   - Between declarations and executable code in functions.
   - Between each adjacent pair of functions.
   - Between major blocks of code.
   - Around assignment, relational, and logical operators.
   - Following for, while, if, and switch.
2. *Line breaks*. Generally: one statement per line.

   Specifically: `(' on same line as if, else, switch, for, while, and do but on a new line for the start of a function. In all cases, `)' on the start of a new line.
3. *Indenting*. Generally: indenting with tabs only.

   Indent one tab stop within functions, struct, if, else, switch, for, while, and do.

4. *Comments*. Generally: at the end of a statement line

   Symbol comment (') is inserted at the front of every line to support only a line-comment syntax.

5. *Global functions*. Specification at module form.

   Defined and implemented before invocation, where possible. [34]

6. *Reuse codes*. Generally: change only the index

   Some codes can be reused in similar operations, loop and others function.

Below is the sample of If...else codes used in this program:

```
If Text4(0).Text = 30 Then

    markahbab8 = markahbab8 + 1

Else:   Text4(0).ForeColor = &HFF&

End If
```

Another sample for the open shell of Visual Basic execute file and Director movie file:

```
Shell App.Path & "\Pakej.exe", vbMaximizedFocus
```

5.4.3 Microsoft Access 97 Data Capture

Finally, all EasyAccount's data and information is entried and retireved from database. It is very important to have a complete information in the database. This data in posted from to database or retrieved from database to global variable in Module or local variable in Form.

Collect the student's marks, which either gets from Exercise Section or Pass Year Question Section is a tedious work to capture the data. Then match the marks with the student's record in the database.

To match and to display the new forecast questions selected from 3 set existed Pass Year Question are consumed some time to capture the integrity and updated of information.

Here given a sample to describe the open database:

```
Dim cnn As Connection

        Set cnn = New Connection
```

```
cnn.CursorLocation = adUseClient
cnn.Open "dsn=mark"
```

Here given a sample to describe to display the selected set exercise from database:

```
Do Until Adodc1.Recordset.EOF
        Select Case Adodc1.Recordset.Fields!Latihan
Case 8
        If Adodc1.Recordset.Fields!Latihan = 8 Then
                If Adodc1.Recordset.Fields!Set = 1 Then
                        Call frmBab8s1.Show
        ElseIf Adodc1.Recordset.Fields!Set = 2 Then
                        Call frmBab8s3.Show
                End If
        End If
End Select
        Adodc1.Recordset.MoveNext
Loop
```

5.5 Required Files

The Add-in Manager in the Visual Basic 6.0 provides a Package and Deployment Wizard helped in create the setup files so that this application can be installed in any computer. The EasyAccount is packaged by burning together all the setup files created from Visual Basic execute files and Director project files. The other files like notes documents, database and ReadMe note pad are included in with the CD-ROM.

5.6 Testing

System testing ensure that the system is doing and producing the perceived output. It is a crucial element of software quality assurance and represents the ultimate review of specifications, design and coding. [31] Refer to Figure 27 for the testing process.

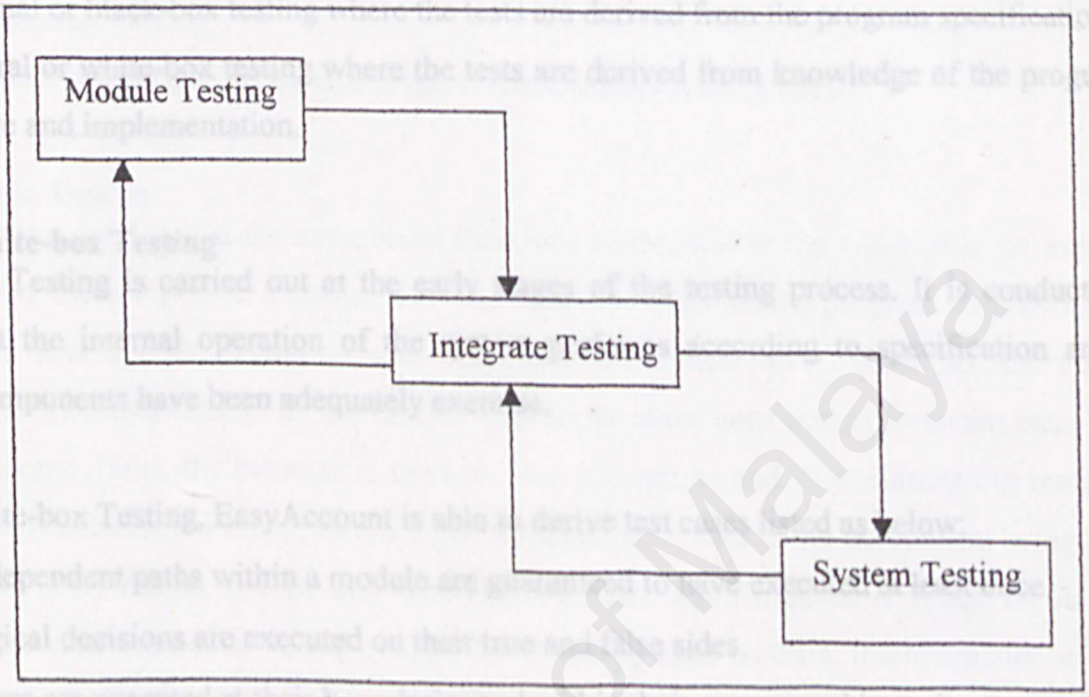

Figure 27 Testing Process

Testing is carried out to meet the following objectives:

- To executes a program with the intent of finding an error.
- To demonstrate that software functions appear to be working according to specification and that performance requirements appear to have been met.

5.6.1 Defect Testing

Testing is not the first place where fault finding, but testing is focused on finding faults, and there are many strategies to make the testing efforts more efficient and effective.

Verification topics include structural (white box) testing and techniques for code verification. Also included will be verification and integration of foreign code, testing techniques and how to apply them, including code-based and specification-based testing,

hands-on application of the testing process, including test case generation, and test adequacy, test validation, test execution, and automation. [32]

There are two approaches to defect testing:

1. Functional or black-box testing where the tests are derived from the program specification.
2. Structural or white-box testing where the tests are derived from knowledge of the program's structure and implementation.

5.6.1.1 White-box Testing

White-box Testing is carried out at the early stages of the testing process. It is conducted to ensure that the internal operation of the system performs according to specification and all internal components have been adequately exercise.

Using White-box Testing, EasyAccount is able to derive test cases listed as below:

- All independent paths within a module are guaranteed to have executed at least once.
- All logical decisions are executed on their true and false sides.
- All loops are executed at their boundaries and within their operational bounds.
- All internal data structures are executed to ensure their validity.

5.6.1.2 Black-box Testing

Black-box Testing is a testing strategy that derives test data solely from the requirements' specification. It is being applied during the last stages of the testing process.

Using Black-box Testing, is the errors listed below may be found:

- Missing or incorrect functions
- Interface errors
- Errors in data structures or external data access
- Initialization and termination errors.

5.7 Testing Strategies

In general, three types of testing are performed in EasyAccount's development. They are included:

a) Module Testing or program testing
b) Integration Testing
c) System Testing (traced back to original requirements specification)

5.7.1 Module Testing

Module testing verifies that the component functions properly with the types of input expected from studying the component's design. The first step is to examine the program code by reading through the source code, trying to spot algorithm and syntax error. After all, the code is compared to the requirements of the design in order to make sure that all relevant cases have been considered. Next, the browser is used to view the results and then eliminating remaining syntax error if necessary. Finally, feed a predetermined set of data to the component being tested and observe what output actions and data are produced. Each module is tested on its own, isolated from others modules in the system. After testing each module, the interaction of these components must be tested again.

For the module testing part, first the types of faults are identified.

a) Algorithmic faults are fault that occurs when a logic or components does not produce the desired output because the processing part contain error. This type of errors are easy to spot just by reading through the program or by simulating the types of input the system will receive during its normal working condition. Typical algorithmic faults include:
   - Branching too soon
   - Branching too late
   - Testing for the wrong condition
   - Forgetting to initialize variables or set loop in variants
   - Forgetting to test for a particular condition.
b) Documentation fault occurs when the documentation does not match what the program actually does. This will cause other problems in the development of the program later as many modification done are based o the documentation itself.

c) Timing or coordination faults occur when the code coordinating these events is inadequate. This fault is hard to detect since it is hard to predict all system state and may be impossible to replicate the fault after it had occurred.

5.7.2 Integration Testing

When all modules have been tested individually and work fine, there will be problem when they put together. This is because of interfacing, below are the problem faced:

- Data can be lost control an interface;
- One module can have an adverse effects on another;
- Sub-functions may not produce the desired major function when combined;
- Individually acceptable impression may be magnified to unacceptable levels;
- Global data structures can present problems.

Integration testing is a systematic technique for constructing the program structure while conducting tests to uncover errors associated with interfacing. The objective is to take unit-tested modules work together as desired in the system and build a program structure that has been dictated by program design specifications.

5.7.2.1 Bottom-up Integration

It starts to build and test with modules at the lowest levels in the program structure making up the main program. The Bottom-up integration is implemented with the following steps:

1) Low-level modules are combined into cluster that perform a special software sub-function.
2) A driver is written to co-ordinate test case input and output.
3) The cluster is tested.
4) Drivers are removed and clusters are combined moving upward in the program structure.

5.7.3 System Testing

System testing is to verify that all system elements have been properly integrated and perform allocated functions. Once the entire system is validated, it must be combined with other system element such as hardware, end-user and databases. EasyAccount must achieve reliability, robustness, accuracy, flexibility and modularity.

A classic system testing is "finger pointing" that when an error is uncovered, each system element developer will blame others for the problem. The actual solutions the software engineer should anticipate are:

1) Design error-handling paths that test all information coming from other elements of the system;
2) Conduct a series of test that simulate bad data or other potential errors at the software interface;
3) Record the results of test to use as "evidence" if finger pointing does occur;
4) Participate in planning and planning and design of system tests to ensure that software is adequately tested.

5.7.3.1 Security Testing

Security testing attempts to verify that protection mechanism built into a system will in fact protect it from improper penetration. The tester may attempt to acquire passwords through external clerical means, may attack the system with custom software designed to break down any defense that have been constructed; may overwhelm the system, thereby denying services to others; or may purposely cause system errors.

5.7.3.2 Performance Testing

Performance testing is designed to test run-time performance of software within the context of an integrated system. Performance testing occurs throughout all steps in the testing process even at the unit level. It is often necessary to measure resource utilization (e.g. processor cycles) in an exacting fashion. These tests depend on the nonfunctional system specified.

5.7.3.3 Configuration Testing

Configuration tests are conducted on various types of hardware and the results in accordance with minimum requirements. But the best results will appear when the hardware configuration is above the minimum requirements. Furthermore, different results but these are because of the way the different PCs video card renders the colors as well as the amount of colors supported by the video card. But this is beyond our control as there is a variety of video cards in the market.

5.7.3.4 Timing Testing

After the configuration tests, the system is put into timing tests where the respond time of the system is evaluated. This is because since it takes time for the animation or sound files to load into memory before it could be displayed or played, the respond time of the system is very important.

5.7.3.5 Human Factor Testing

Finally, the human factor tests are conducted where the all of the system are examined. User reaction as well as the display screen, the size of fonts used and the easy of use.

As the performance tests had been finished, the system is put under acceptance testing where users are asked to evaluate the system. The pilot test provides the users with the system and let them test the system on their own without following a certain degree of test specifications. Since time is limited, the pilot test is experimented by friends only.

5.7.3.6 Installation Testing

After all the various tests are conducted, the system is put into final stages of testing which is the installation testing, the testing is done in various PCs in the project lab so that different PCs configuration could be tested.

5.8 Analysis of Test Results

5.8.1 Achieve the main objectives of the project

According to the interactive learning section, standard account questions, and direct posting features for SPM account student, this fulfilled the project's objective. Currently, the accounting learning style is manually through its paper-intensive strategy of teaching and examining. By using the new windows-based system, much of the paper work will be eliminated because electronic form will be used to replace the manual form.

5.8.2 Enhancement on integrate Exercise and Pass Year Question sessions capability

The complete EasyAccount system is not complete without Exercise and Pass Year Question sessions. In the future, the number of questions in Exercise and Pass Year Question must be incorporate into EasyAccount Administrated through the administrator section. With Exercise

and Pass Year Question session, every student is easily applies the accounting. Student can post their result and personal information through the Exercise and Pass Year Question sessions. It is convenient to the teacher and save their time in collects and stores the student's result.

5.8.3 Support other PCs

As stated, this system developed in Visual Basic 6.0 and Macromedia Director 7.0 for execution. The PCs without this two software also can setup for execution. That means that all the students also can use this application in any PCs.

Chapter 6 Evaluation and Conclusion

System evaluation is a process of evaluating the system developed, by identifying the system strengths, system limitations, and future enhancements. It also highlights the knowledge gained, and problems encountered during the development of the system and solutions taken to overcome these problems.

6.1 Project Problems Encountered and Their Solutions

Some problems were encountered throughout the development of EasyAccount system. These problems, together with the approaches taken to solve them are documented into two separate sections:

1) Project studies and analysis
2) Project implementation and testing

6.1.1 Problem and solution during Project Studies and Analysis

EasyAccount is a multimedia education software application. There are many programming languages and tools that can be used as development tool for Accounting system. Limitation of knowledge about the programming tools has caused tools selection process becomes more critical.

6.1.1.1 Determining Scope of the System

It is impossible to build a full scale complete system within the time given frame. EasyAccount include Accounting System Section, Accounting Learning Section and System Administrator Section. It is a quite huge program for a thesis project. Many discussions were held with project supervisor to outline the scope of the project to be built during the initial stages. After the scope has been defined, analysis of current computerized system was done.

6.1.1.2 Difficulties in Choosing a Development Technology, Programming and Tools

Our technology is heading into a new era. There are many software tools available to develop an accounting system as stated in the earlier chapters. Choosing a suitable technology and tool was a critical process as all tools have their strengths and

weaknesses. In addition, the availability of the required tool for development was also a major consideration.

In order to solve this problem, seeking advises and view from project supervisor, course mates and even seniors engaging in similar project were carried out. Further more, surfing through the Internet and visiting the library helped to clarify some doubts.

6.1.1.3 Lack of Accounting Knowledge

To develop a powerful Accounting System for the SPM student required a deep understanding in Accounting studies. During the experiment application development, many problem have been encountered because of the limitation of Accounting knowledge. Some accounting formula that needed to develop certain experiment applications is not included in the SPM accounting syllabus.

To overcome this problem, other accounting books beside the SPM accounting books have been studied. For an example, the collision of two books was used to develop the accounting formulas that are only covered in the SPM level.

6.1.2 Problems and Solutions during Project Implementation and Testing

Some problems were faced during project implementation and testing process. Almost, the causes of problem are the inconsistency and bugs during the development phase. Those problems that encountered are explained below:

6.1.2.1 Big File Size for Packaged Macromedia Director File.

This is because the size of sound file is big and the drawing tools included with the Director are not powerful. So many images have to be imported into Macromedia Director. Since the smaller files improved the performance of the whole package, the sound files used are encoded in a lower sample rate and in 8-bit format. This makes the sounds appear softer as well as the tone appears longer.

Another solution is to encode the sound into MP3 format which is quite similar to WAV format but with different encoding. As with the MP3 format, certain degree of sound degradation many arise.

Images that are imported into Macromedia Director are converted into JPEG format. Other than that, the colors of the images are limited to 8-bit.

6.1.2.2 Could Undo Once Only in Director

This problem is the most difficult to handle as it provides the user with one undo only. Since the Macromedia Director allows the user to change the setting of the objects on the screen when playing, it further aggravates the problem. The solution is to try to make only one change at any time and minimize the needs to use the undo function.

6.1.2.3 Selection for System Development

One of the major problems encountered during the project system studies analysis is the difficulty in choosing a development technology, programming language and tools. There are many ways and tools available to develop a multimedia application as stated in the earlier chapters. To determine which approach to used, seeking advises and views for project supervisor and course-mates engaging in similar project are carried out. Furthermore, surfing through the Internet and visiting the library help clarify some doubts.

6.1.2.4 Lack of Time

Because of a lot the studies and researches that were required to implement to system, this caused to lack of time to finish whole module. Some of the features still not add in the system like the on line tutor in accounting learning system. A complete testing to the system also not really perform.

6.2 System Strengths

EasyAccount has several features of qualities that are listed as below:

6.2.1 Attractive Animation and Interactive Experiment Application.

EasyAccount provides some animation to enhance students understanding toward the Accounting phenomena. The system allows the student to control the speed of the animation. This has made the learning process more attractive. Subsequently, it is able to capture the user interest in learning.

6.2.2 Storing As Many As Accounting Question

Accounting system allows user to store new exercise, forecast and pass year questions. Consequently, students can be question to improve their performance.

6.2.3 Provide and Easy Tool

The commands and the layout of accounting are easy to use, simple to learn and understandable. Normal users who have some experiences in using software in the market will find this accounting system is easy to use.

6.2.4 User Friendliness

EasyAccount is developed base on GUI. Many useful icons are provided to allow easier access. Besides, it has a very user friendly and consistent environment that is similar to other window applications. This user-friendly interface and predictable control object will shorter the learning curves and reduces training cost such as money and time.

EasyAccount provided sufficient instruction and guidance on the interface to enable the user to use the system effectively.

6.2.5 Reliable System with Effective Error Recovery

Input by users is validate and verify though using the scripting. For example, an update failure to a record will be handled by the system and a user-friendly massage is generated informing the user about the error and at the same time the system would recover from the error and continue to be used.

6.2.6 Able to Provide Database Maintenance

Agents are able to do housekeeping for database maintenance. They can add, delete, update and view record. Besides they can view the sales report for each agent. There are two type of report which are monthly and yearly report.

6.2.7 Authorization and Authentication

Every user has a user ID and password. Administrator section and exercise, pass year and forecast question section only allow authorized users to access the system. Furthermore, it has the capacity of preventing unauthorized useds from accessing the application. An invalid message will be prompted if a user tries to use the system without logging in wrongly. It ensures users login before entering the system.

6.2.8 Direct Posting

The daily transaction module handles all daily transaction. User key-in the daily transaction in the form of Journal. The entire transaction wills automatically posting from Journal to Ledger.

6.2.9 Help Module

If students need any help, help section is a best solution for them. Including search function and about system.

6.3 System Limitations

EasyAccount is a fully operational electronic learning system. However it just like other system it as some limitations. The following are the limitation of EasyAccount:

6.3.1 Save Question in Exercise and Question Section

Accounting system does not provide the save function in the pass year question, forecast question or exercise section. If user can complete the all quiz question, they cannot continue with the same quiz in the future.

6.3.2 Recovery

EasyAccount does not recover the quiz and exam section when the system fails or halts. When the user login to the system and go to the quiz or exam section again, the

questions are different with the previous quiz or exam and they have to read the quiz or exam.

6.3.3 Database Not Encrypted

The information stored in database is not secured enough because it is stored in a plain text format rather than in encrypted format.

6.4 Future Enhancements

The system limitation should be improved and corrected to enhance the functionality of EasyAccount in the future. These are some suggestions to add more values to the current version of EasyAccount.

6.4.1 Implement Accounting System in Multi-User Environment (Network).

To benefit all the users, accounting system will be modified to enable network accessing. This can be achieved by using the LAN environment. In a multi-user environment, Accounting system is needed to install only in a server and other machines that are connected to the server can gain the access to the Accounting system. Every user has his/her own account to access the accounting system through network system. This is useful for the school, which they do not need to install in many computers to allow students to use the system.

6.4.2 More Interesting Animation and Interactive Experiment Application

Since the package consists of only graphics, a few interactive samples and animations should make the package more attractive. To make student to understand accounting better, more attractive animation files will be included in the note section in the next version. This will make the learning process more attractive and efficient.

6.4.3 English Language Support

Future enhancement for The EasyAccount system will include language support. This will enable information to be displayed in the different languages like English. This will broaden the usage of the system.

6.4.4 Error Detection Features

This system actually need a more comprehensive errors comprehensive error detection feature to ensure that only valid input is being passed to the server and it is done through client-side scripting. This is important in ensuring that the system is robust and easy to maintain the reliability of the system.

6.4.5 Provide More functionality

There should be additional modules for the Accounting System. These modules include Payroll, Tax, Costing, Inventory and Invoicing, so that can generate a more complete report for an organization.

6.4.6 Generate Report on Student Performance

The existing student's performance evaluation is just a simple marking system that showing the marks they get in the view. For future enhancement, the electronic summary of student performance will both in submitted assignment and quiz shall be able to be displayed in more graphical output such as, in the form of graph or line charts. This enables teacher to compare and analysis student's performance at a glance.

6.4.7 Generate Forecast Question

This system already have one set of the forecasting paper for SPM Accounting 2001. This will help the student to prepare for their exam in this year. Other than that, this system should automatically to generate another forecast question based on the past year question in accounting and the forecasting paper 2001.

6.4.8 Various Question Storage

A database should be used to store the various questions where the user could be tested on a random basis. This means that user could be tested on different questions each time they do the tutorial and pass year questions.

6.5 Knowledge Gained

Through this project, a lot of experiences have been gained, new knowledge has been acquired and more importantly, there has been an improvement in project management.

Having an update knowledge and information becomes important in keeping up fields in the information technology edge. The skill choosing a suitable programming language as a main development tools is a good experience. All programming tools have their own individual strengths and weakness. There are two ways to overcome this problem retrieving information from the Internet and most of the ambiguities are resolved by reading up on relevant materials guidance from course mates and project supervisor.

I have to apply practically what I had learnt in courses and what I did in research. This is really a good chance for me to handle the whole progress of this bigger and unique project from the analysis stage until design stage. In between, I have learnt the important of methodology for a software system development. Knowledge was gained on the client-server development environment, the database system, programming and concepts, as well as a LAN configuration.

There was an exposure to software tools that include Microsoft Visual Basic 6.0, Microsoft Access 97 and Macromedia Director 7.0 that enable the implementation of the software engineering approach to be implied in the development of this project system. Here, theories and knowledge gained throughout the course of computer science studies like software engineering, system analysis and design were literally put into practice too.

Overall, this project proposal is a challenge task for me for the whole third year's thesis report and all the problem faced and experiences gained during the system design should be useful in future endeavors.

6.6 Conclusion

Finally, EastyAccount package is finished and this report will cover everything from the first report plus the analysis, design, testing, problems and enhancements. Overall, the project has achieved and fulfilled the objectives and requirement as EasyAccount system as determined during the system analysis. The aim of this project is to develop an interactive Accounting SPM multimedia learning package.

Throughout the Prototyping model, I can change my development analysis and design for the EasyAccount system. After analyzed deeply, I found that I have to change my proposed design in order to perform a better and more interactive interface or value added features effectively and efficiency. Mostly, the designs changed into current system are Graphical User Interface (GUI) and functionality for Exercise Section and System Administrator Section.

EasyAccount includes not only a learning package useful for the student but also an administration module for teacher. It achieves paperless administration because the system includes administration module. Besides using the database management system to do maintenance chores directly, the administration module provides an alternative to do remote maintenance anywhere on the spot. EasyAccount enables efficient and effectiveness learning for the students and teaching process for teacher as well as providing a border database management system for the database management system for the teacher.

EasyAccount has been successful in attaining its objective of develop a high quality course, meets to syllabus exercise and pass year question were for the user who will sit for the SPM Accounting. EasyAccount was found to be user-friendly, easily understand and effective will make the accounting learning process more attractive and efficiency.

The development of this package doesn't go smoothly as anticipated but luckily we still managed to go through. Alas, I would like to thanks my project members who helped to find out some doubt and thanks all my friends who helped to test out the accounting package as well as give invaluable advice on how to improve the package further. Finally, many appreciation to my supervisor, Puan Norizan for being understanding, supportive and also provide us with a helping hand.

APPENDIXES

Appendix A: User Manual

Table of Contents

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List of Tables

1.0 Introduction

EasyAccount is a windows-based application. It is designed to give and help students understanding in SPM account syllabus. It is easy to use and learn because the user interface is user friendly. All the functions in this system can easily be executed by a simple point and click on the available function button.

The objectives for this system are:

- *To provide easy learning tools to the user*
- *To provide a multimedia interactive and useful learning tools for the user*
- *To reduce redundancy process by create an automatic posting*
- *To reduce the double recording process*
- *To improve the current account learning teaching style*

This manual contains instruction on how you can make full use of the package. It is well organized. It will cover all the functionality in the package as well as some tips to use the package effectively.

The user manual will guide you through the functions available in the system. This manual includes the following 4 parts:

- *System overview and essentials*
- *Accounting Learning Section*
- *Accounting System Section*
- *Administrator System Section*

2.0 Hardware and Software Requirements

There is an application to install and set, EasyAccount application. This application should be installed in the PC. Please check the hardware and software requirements in below:

2.1 Hardware Requirements

Listed below are the hardware requirements to run this system:

- *At least 32 MB RAM*
- *At least Pentium MMX 166 MHz processor*
- *At least 1000 MB free hard disk space*
- *A SVGA Graphic Adapter*
- *Standard peripherals as Keyboard and mouse as input devices*
- *Monitor and Speaker minimum 120 watt as output devices (printer added)*

2.2 Software Requirements

The software requirements needed to run EasyAccount are:

- *Running on Windows 95 or Windows 98 or latest OS*
- *Microsoft Word 97 or 2000*

3.0 Installation and Setup EasyAccount in Windows 98

Before install EasyAccount system, make sure your computer meets the minimum hardware and software requirements as stated in the previous chapter.

Below as the steps to install EasyAccount package

- Insert CD into CDROM
- Go to Start > Program > EasyAccount
- Updating process completed, remove CD from CDROM

First Time Getting Started Program EasyAccount

After finished installing the EasyAccount system, you may start the program that can be used by through clicking on the Start > Program > EasyAccount. The main menu for EasyAccount will look like Figure 1.

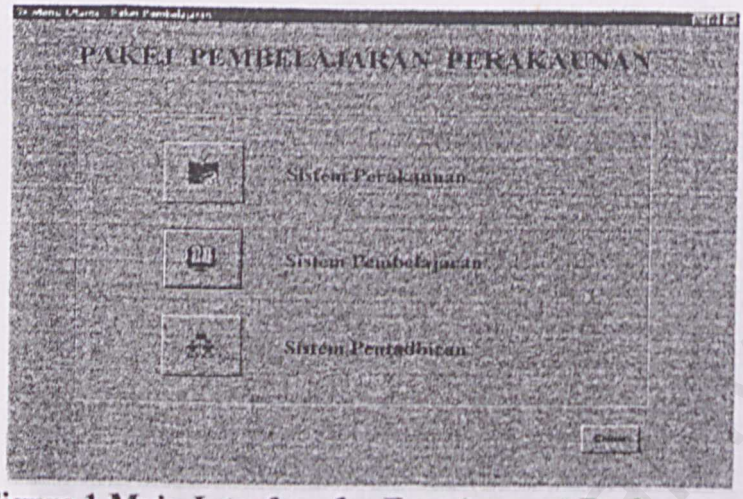

Figure 1 Main Interface for EasyAccount Package

EasyAccount Main Menu included the following sections is show in Table 1:

Table 1 Table for EasyAccount Main Menu

Icon	Section	Description
	Accounting System Section	♦ Provides an easy use accounting system ♦ Direct posting entry data ♦ Create account report and statement
	Accounting Learning Section	♦ Contains 14 chapter accounting lesson ♦ 2 set of past year question and 1 set forecast question are provided ♦ Provides exercises for each chapter ♦ User can print out the notes for each chapter.
	Administrator System Section	♦ Provides exercise and SPM question result ♦ Provides selection on set exercise ♦ Provides create new forecast question

Select where you would like to go.

Part 1 Accounting Learning Section

To use the accounting learning system, it is recommended that you have the EasyAccount CD-ROM running closed by. The main menu for Accounting Lesson Section will look like Figure 2. The functions of the four buttons are summarized in Table 2.

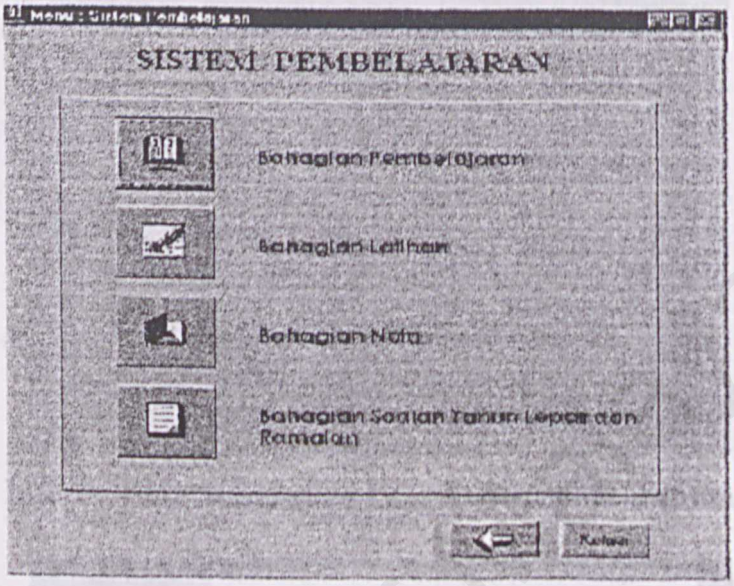

Figure 2 Main Interface for Accounting Learning Section

Table 2 Table of Accounting Learning Section Menu

Icon	Section	Description
	Learning Section	♦ Contain the entire SPM accounting syllabus ♦ Provide user with interactive learning environment with graphic, sound and animation.
	Exercise Section	♦ Provides exercises for 14 chapter accounting lesson ♦ 2 set of questions and user can know the result after submit the form
	Notes Section	♦ Contains 14 chapter notes for each accounting lesson ♦ User can print it out
	Pass Year and Forecast Question Section	♦ Prepare the past year question for SPM accounting ♦ Using the current examination paper ♦ One set of forecast question as a guideline for student

Accounting Lesson Section including the following modules:

1.1 Learning section

Figure 3 shows the first screen for Learning section. Select which chapter lesson that you would like to go. If the lesson is selected, the screen below is visible as Figure 4.

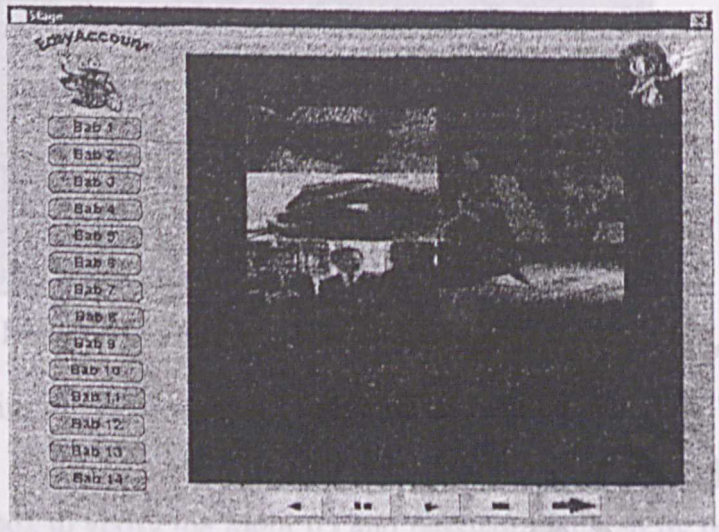

Figure 3 Main Interface for Accounting Learning Section - Lesson Session

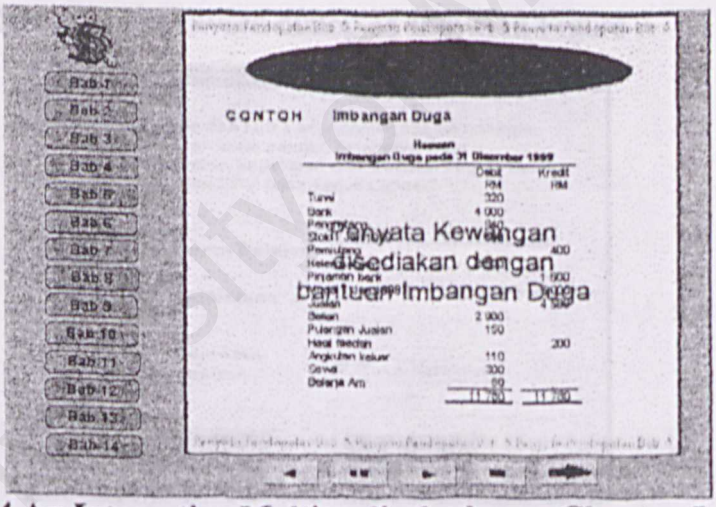

Figure 4 An Interactive Multimedia for lesson Chapter 5

1.2 Exercise section

If the login successfully, the Exercise's first screen below is visible as Figure 5.

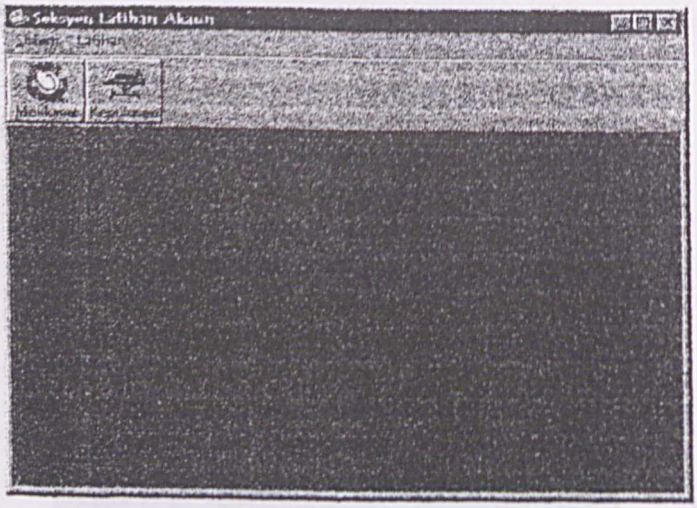

Figure 5 First Screen for Exercise Section

Exercises Section including the following menus:

1.2.1 Login

This is the login dialog box to verify the login ID and password entered by the student. After login successfully, the exercise main screen is show as below in Figure 6. Click the "*Tukar Katalaluan*" for display the change password dialog as shown in Figure 7.

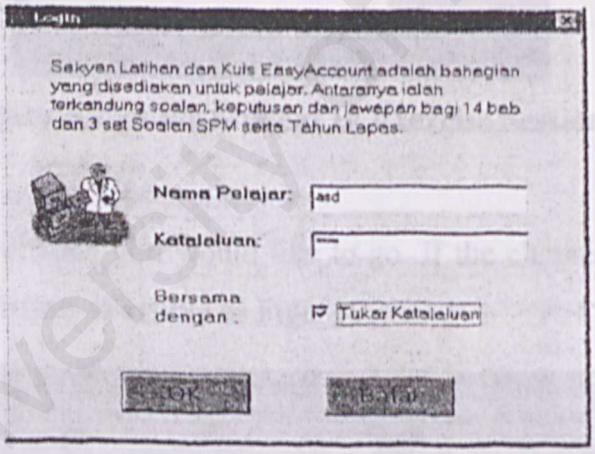

Figure 6 Student Login for Exercise Session

1.2.2 System

This module consists of several sub-modules, there are "*Tukar Katalaluan*" for change the old password into new password, "*Logout*" for logout the system, "*Tip*" for getting help and "*Exit*" for exit the program.

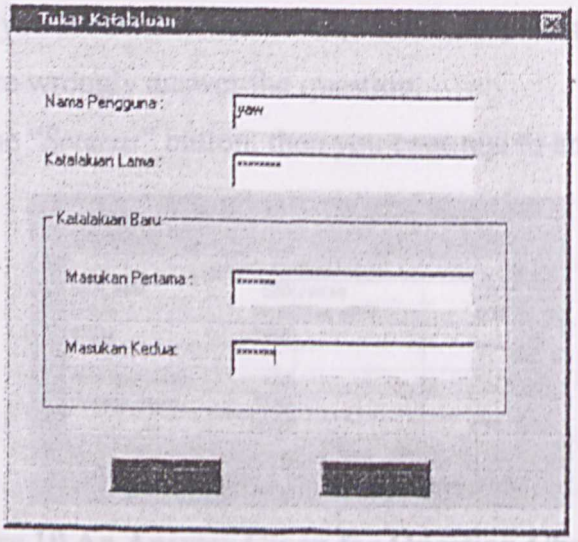

Figure 7 Dialog for Student Change Password

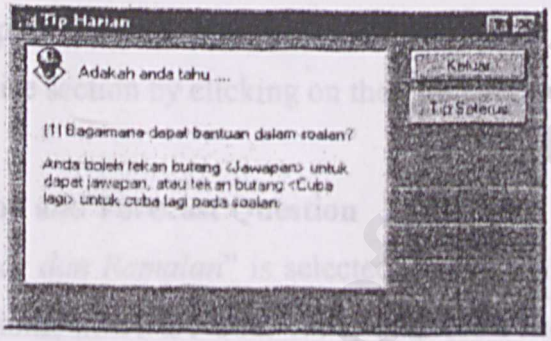

Figure 8 Tips for Student In Exercise Session

1.2.3 Exercise

1. Select which exercise chapter you would like to go. If the chapter 5 exercise is selected, the question screen as below is visible as Figure 9.

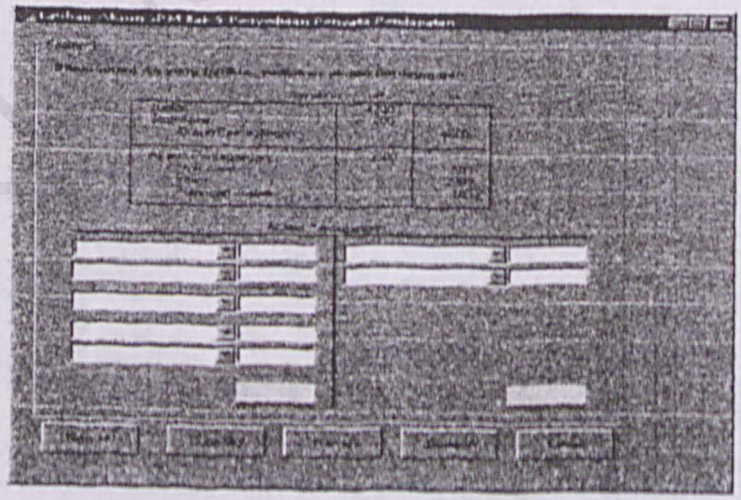

Figure 9 Exercise Question for the Chapter 5

2. Click "*Hantar*" after you finish to answer the question, or you can click "*Cuba lagi*" when you found that you are wrongly answer the question.
3. If the question has the "*Seterus*" button, then you continue to answer the next question.

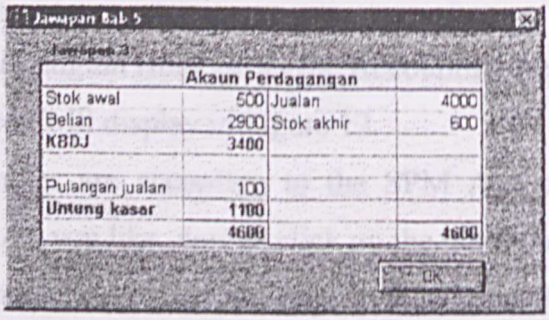

Figure 10 An Answer Given for Question Chapter 5

4. Student can get the answer by clicking on the "*Jawapan*" button, one of the sample of the answer screen will display as shown in Figure 10.
5. You can exit the exercise section by clicking on the "*Keluar*" button.

1.3 Pass Year Question and Forecast Question

If the "*Soalan Tahun Lepas dan Ramalan*" is selected, the screen below is visible as Figure 11. There have 3 set questions, which are Year 1998, Year 1998 and Forecast Question.

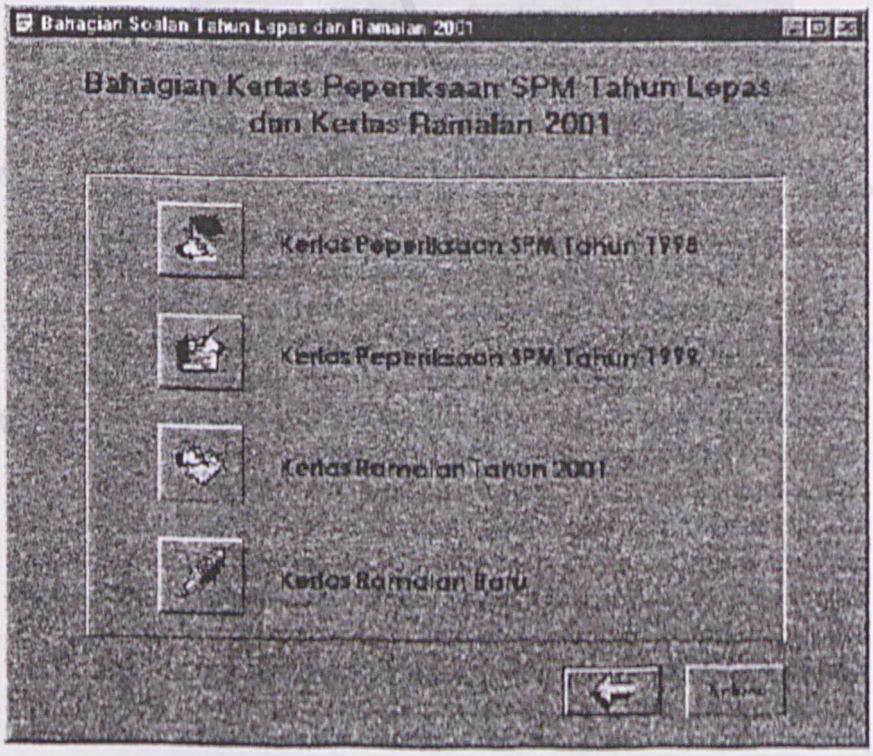

Figure 11 First Screen for Pass Year Question and Forecast Question Section

Same with the Exercise Section, student has to enter the correct login ID and password. After login successfully, all selected set SPM Question will display.

1.4 Notes

1. After click on button "*Bahagian Nota*" from the Accounting Learning System main menu, then the following screen will display in Figure 12.
2. The contents of the notes are according to the SPM Account syllabus. Select which chapter (*Bab 1 to Bab 14*) you like, double click on the button to get the note.
3. You can select which notes you would like to print in Microsoft Word document format.

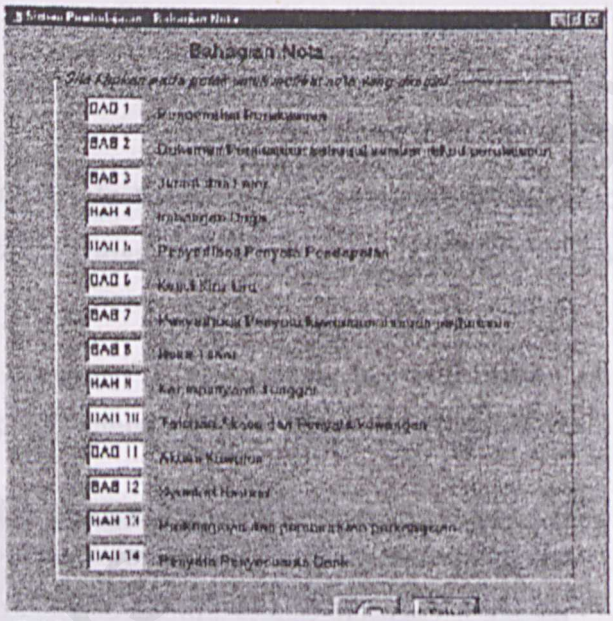

Figure 12 The 14 Notes for Each Chapter in Accounting Lesson

Part 2 Accounting System Section

To use the Accounting System, user should:

2.1 Configure the DSN for access database

Before Accounting System can be functioned properly, DSN (Data Source Name) for local database should be configured.

1. Click on Start - setting - Control Panel.
2. Click on the icon of ODBC data Source (32 bit) from the screen.
3. Select the tab of User DSN.
4. Click on the Add button. A driver selection list will be displayed.
5. Select Microsoft Access Driver (*.mdb) from the list.
6. Enter the DSN as easy.
7. Click on the select button to select the easy3 database. (It will be located at the path that you have selected to install the inventory application) and then click on the OK button.

2.2 Accounting System

The main menu for Accounting System Section will look like Figure 13.

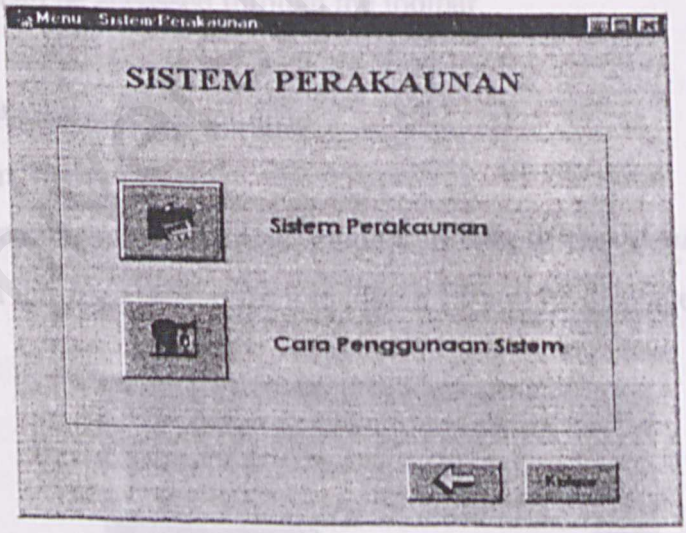

Figure 13 Initial Interface for Automatic Accounting System

1. From the main menu for the EasyAccount system, click on "*Sistem Perakaunan*" button.
2. Click on "*Sistem Perakaunan*" button again to direct access to the accounting system.
3. For the beginner, his/her can click on "*Cara Penggunaan Sistem*" button to learn how to use this accounting system.

4. Click the arrow button if you want to go back to the EasyAccount Main Menu.
5. Click the "*Keluar*" button if you want to exit the EasyAccount.

2.2.1 System Menu

1. After user click the "*Sistem Perakaunan*" button, a main menu for Accounting System will display as below :

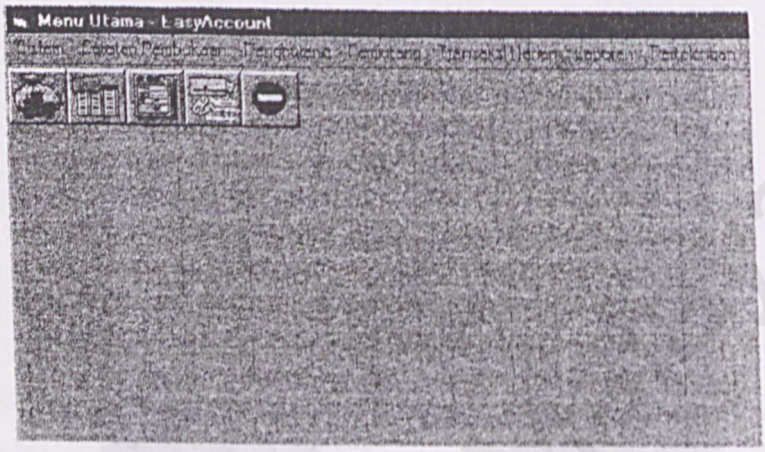

Figure 14 Main Menu for Accounting System

2. Choose the module that needed by clicking using the mouse or using keyboard by pressing together the Alt button and the alphabet that have been underlined.
3. Certain function can be accessed through the toolbar.

2.2.2 How to use Account Type module

1. Add Account Type

1. From the main menu, select "*Sistem*" module to choose the "*Jenis Akaun*" and click on "*Tambah*". Then the *Jenis Akaun* form in Figure 15 will be displayed.

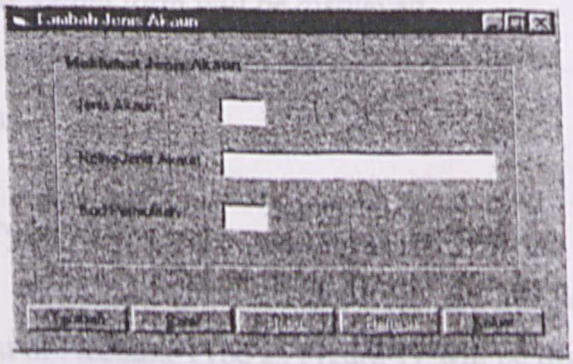

Figure 15 Add Account Type Screen for Accounting System

2. Fill in the Account type detail then click "*Tambah*" button to update in the database or click "*Batal*" button to cancel the add function.

2. Edit Account Type

1. From the main menu, select "*Sistem*" module to choose the "*Jenis Akaun*" and click on "Edit". Then the *Jenis Akaun* form as Figure 16 will be displayed.

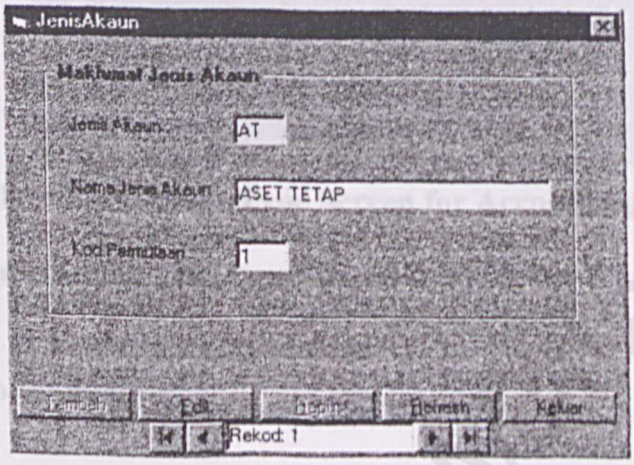

Figure 16 Delete Account Type Screen for Accounting System

2. Positioning to the record, then click Edit button.
3. Now, two buttons will enable which are "Update" and "*Batal*" button. You can modify the record.
4. Click on update button to confirmation the modification or click on the "*Batal*" button to undo the modification.

3. Delete Account Type

1. From the main menu, select "*Sistem*" module to choose the "*Jenis Akaun*" and click on "Delete". Then the *Jenis Akaun* form will be displayed.
2. Positioning the to the record, then click *Hapus* button.
3. Then record will delete.

4. Listing Account Type

1. From the main menu, select "*Sistem*" module to choose the "*Jenis Akaun*" and click on "*Senarai*". Then the list of Account Type as Figure 17 will be displayed in the form.

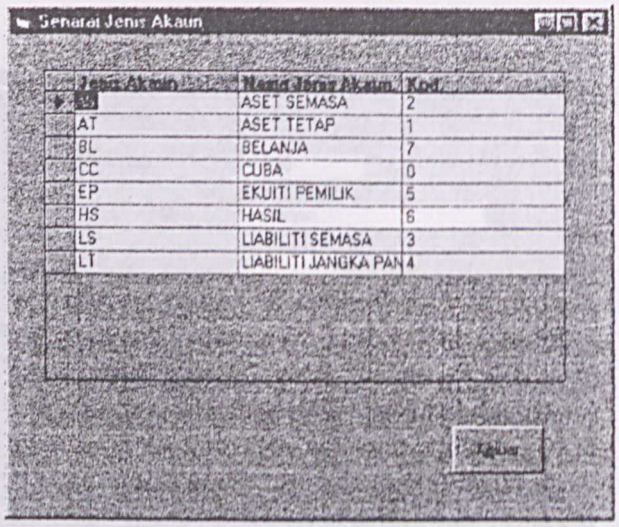

Figure 17 Listing Account Type Screen for Accounting System

2. Click "*Keluar*" button the exit the form.

2.2.3 How to use Account module

1. Add Account

1. From the main menu, select "*Sistem*" module to choose the "*Akaun*" and click on "*Tambah*". Then the Account form will be displayed.
2. Fill in the Account detail then click "*Tambah*" button to update in the database or click "*Batal*" button to cancel the add function.

2. Edit Account

1. From the main menu, select "*Sistem*" module to choose the "*Akaun*" and click on "Edit". Then the *Akaun* form in Figure 18 will be displayed.

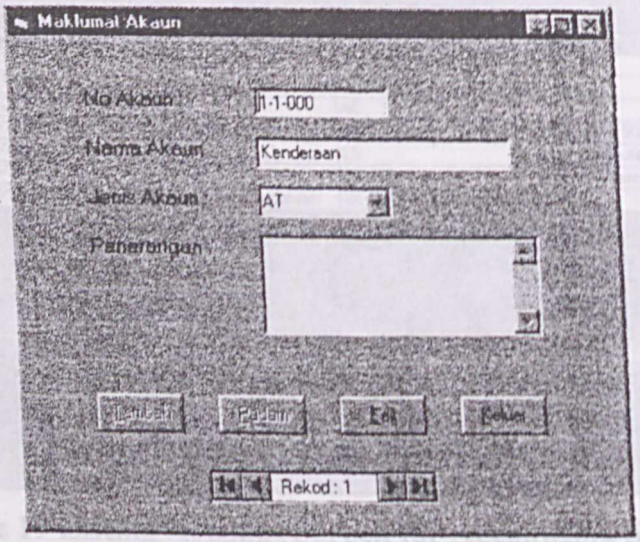

Figure 18 Add Account Screen for Accounting System

2. Positioning to the record, then click Edit button.
3. Now, two buttons will display which are "Update" and "*Batal*" button. You can modify the record.
4. Click on update button to confirmation the modification or click on the "*Batal*" button to undo the modification.

3. Delete Account

1. From the main menu, select "*Sistem*" module to choose the "*Akaun*" and click on "Delete". Then the *Akaun* form will be displayed.
2. Positioning the to the record, then click "*Hapus*" button.
3. Then record will delete.

4. Listing Account

1. From the main menu, select "*Sistem*" module to choose the "*Akaun*" and click on "*Senarai*". Then the list of Account as Figure 19 will be displayed in the form.
2. Click "*Keluar*" button the exit the form.

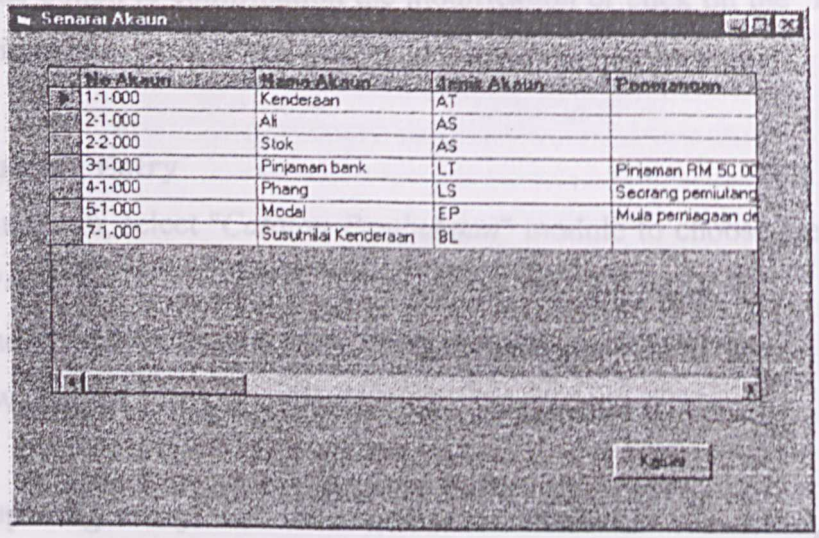

Figure 19 Listing Account Screen for Accounting System

2.2.4 How to use Opening Entry module

1. Add Opening Entry

1. From the main menu, select "*Catatan Pembukaan*" module to choose the "*Tambah*". Then the "*Catatan Pembukaan*" form will be displayed.
2. Fill in the detail then click "*Tambah*" button to update in the database or click "*Batal*" button to cancel the add function.

2. Edit Opening Entry

1. From the main menu, select "*Catatan Pembukaan*" module to choose "Edit". Then the *Catatan Pembukaan* form as Figure 20 will be displayed.

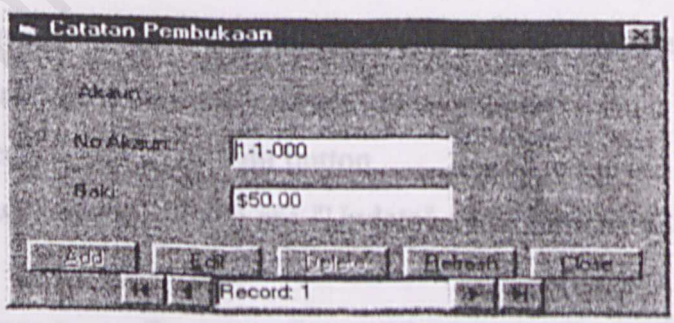

Figure 20 Add Opening Entry Screen for Accounting System

2. Positioning to the record, then click Edit button.
3. Now, two buttons will display which are "Update" and "*Batal*" button. You can modify the record.

4. Click on update button to confirmation the modification or click on the "*Batal*" button to undo the modification.

3. Delete Opening Entry

1. From the main menu, select "*Catatan Pembukaan*" module to choose the "Delete". Then the *Catatan Pembukaan* form will be displayed.
2. Positioning the to the record, then click "*Hapus*" button.
3. Then record will delete.

4. Listing Opening Entry

1. From the main menu, select "*Catatan Pembukaan*" module to choose the "*Senarai*". Then the list of "*Catatan Pembukaan*" will be displayed in the form.
2. Click Ok button the exit the form.

2.2.5 How to use Debtor module

1. Add Debtor

1. From the main menu, select "*Penghutang*" module to choose the "*Tambah*". Then the "*Penghutang*" form will be displayed.
2. Fill in the detail then click "*Tambah*" button to update in the database or click "*Batal*" button to cancel the add function.

2. Edit Debtor

1. From the main menu, select "Penghutang" module to choose "Edit". Then the "Penghutang" form as Figure 21 will be displayed.
2. Positioning to the record, then click Edit button.
3. Now, two buttons will display which are "Update" and "*Batal*" button. You can modify the record.
4. Click on update button to confirmation the modification or click on the "*Batal*" button to undo the modification.

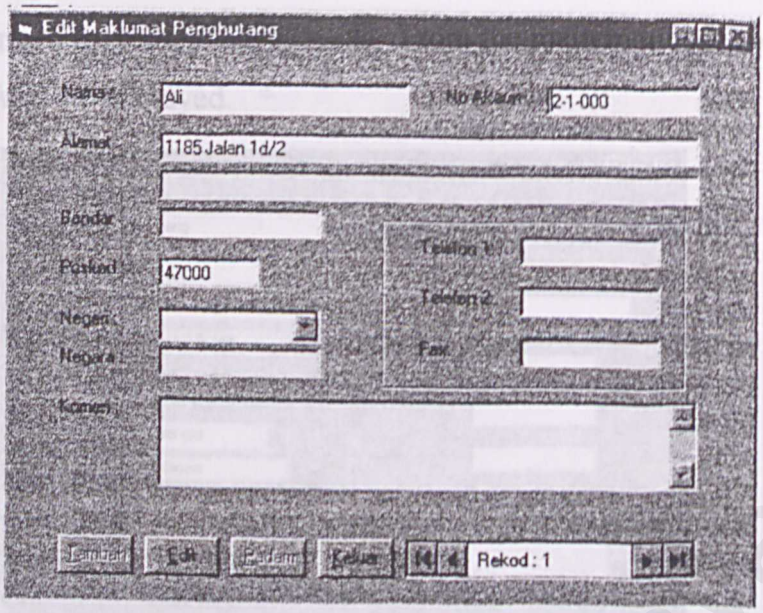

Figure 21 Edit Debtor Screen

3. Delete Debtor

1. From the main menu, select "*Penghutang*" module to choose the "Delete". Then the "*Penghutang*" form will be displayed.
2. Positioning the to the record, then click "*Hapus*" button.
3. Then record will delete.

4. Listing Debtor

1. From the main menu, select "*Penghutang*" module to choose the "*Senarai*". Then the list of "*Penghutang*" will be displayed in the form.
3. Click Ok button the exit the form.

2.2.6 How to use Creditor module

1. Add Creditor

1. From the main menu, select "*Pemiutang*" module to choose the "*Tambah*". Then the "*Pemiutang*" form will be displayed.
2. Fill in the detail then click "*Tambah*" button to update in the database or click "Batal" button to cancel the add function.

2. Edit Creditor

1. From the main menu, select " *Pemiutang*" module to choose "Edit". Then the "*Pemiutang*" form as Figure 22 will be displayed.

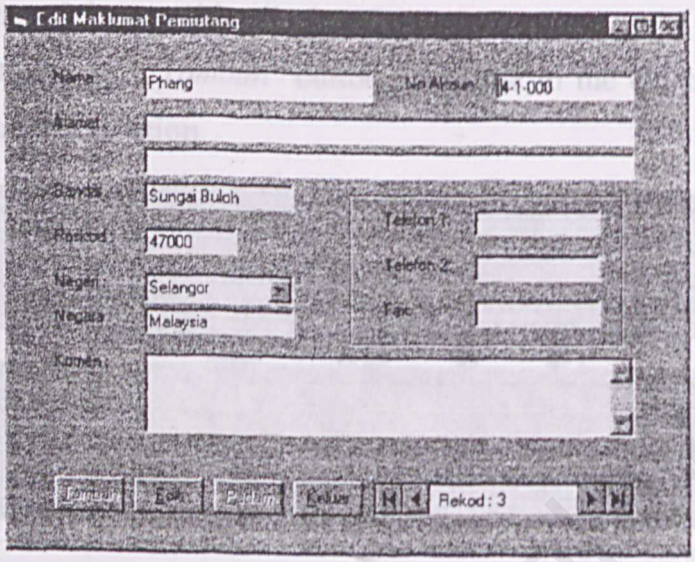

Figure 22 Edit Creditor Screen

2. Positioning to the record, then click Edit button.
3. Now, two buttons will display which are "Update" and "*Batal*" button. You can modify the record.
4. Click on update button to confirmation the modification or click on the "*Batal*" button to undo the modification.

3. Delete Creditor

1. From the main menu, select "*Pemiutang*" module to choose the "Delete". Then the "*Pemiutang*" form will be displayed.
2. Positioning the to the record, then click –"*Hapus*" button.
3. Then record will delete.

4. Listing Creditor

1. From the main menu, select "*Pemiutang*" module to choose the "*Senarai*". Then the list of "*Pemiutang*" will be displayed in the form.
2. Click OK button the exit the form.

2.2.7 How to use Daily Transaction module

1. Add Daily Transaction

1. From the main menu, select "*Transaksi Harian*" module to choose the "*Tambah*". Then the "*Transaksi Harian*" form will be displayed.
2. Fill in the detail then click "*Tambah*" button to update in the database or click "*Batal*" button to cancel the add function.

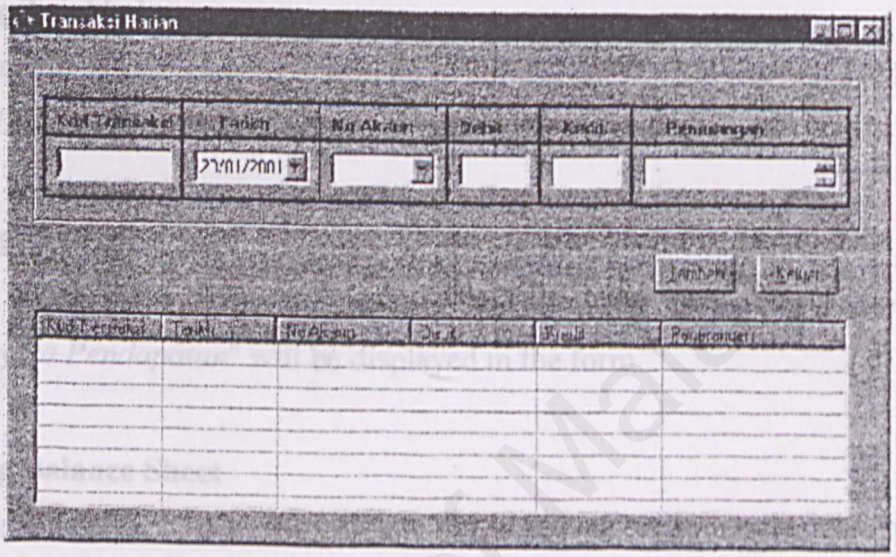

Figure 23 Add Daily Transaction

2. Edit Daily Transaction

1. From the main menu, select "*Transaksi Harian*" module to choose "Edit". Then the "*Transaksi Harian*" form will be displayed.
2. Positioning to the record, then click Edit button.
3. Now, two buttons will display which are "Update" and "*Batal*" button. You can modify the record.
4. Click on update button to confirmation the modification or click on the "*Batal*" button to undo the modification.

3. Delete Daily Transaction

1. From the main menu, select "*Transaksi Harian* " module to choose the "Delete". Then the "*Transaksi Harian*" form will be displayed.
2. Positioning the to the record, then click "*Hapus*" button.
3. Then record will delete.

4. Listing Daily Transaction

1. From the main menu, select "*Transaksi Harian*" module to choose the "*Senarai*". Then the list of "*Transaksi Harian*" will be displayed in the form.
2. Click Ok button the exit the form.

2.2.8 How to use Report module

1. Showing Trial balance

From the main menu, select "Laporan" module to choose the "*Imbangan Duga*". Then the list of "*Imbangan Duga*" will be displayed in the form.

2. Showing Profit and Loss

From the main menu, select "*Laporan*" module to choose the "*Penyata Pendapatan*". Then the list of "*Penyata Pendapatan*" will be displayed in the form.

3. Showing Balance Sheet

From the main menu, select "*Laporan*" module to choose the "*Kunci Kira-kira*". Then the list of "*Kunci Kira-kira*" will be displayed in the form.

2.2.9 How to use Help module

1. Searching an accounting term

1. From the main menu, select "*Pertolongan*" module to choose the "*Pencarian*". Then Searching form will be displayed.
2. Type the keyword or word that you want to looking for and then press the search button for finding the information to display in the Text Box or click the close button to exit the searching function.

2.3 How to use Accounting System

1. After user click the "*Cara Penggunaan Sistem*" button, a main menu for How to use the System will display in Figure 24 as below:

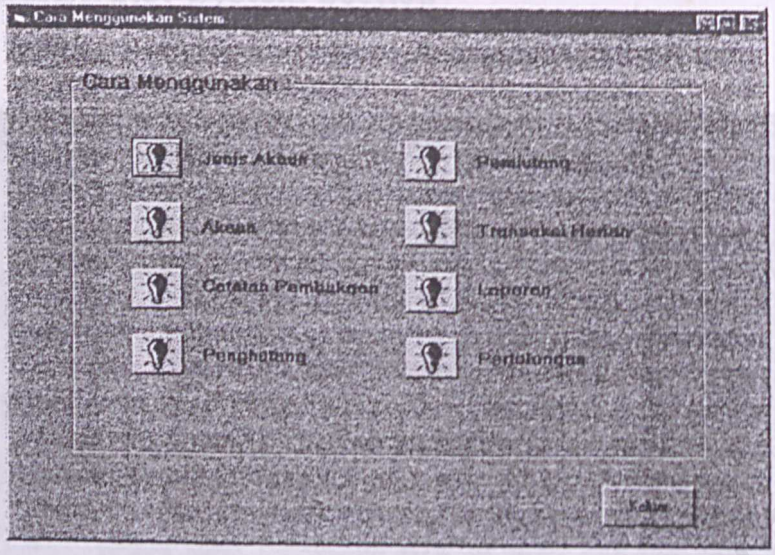

Figure 24 User Manual for Accounting System

2. Select the thing that you want to now and then click on the button .
3. Click "Keluar" button to exit this menu.

Part 3 Administrator System Section

The main menu for Administrator System Section will look like Figure 25.

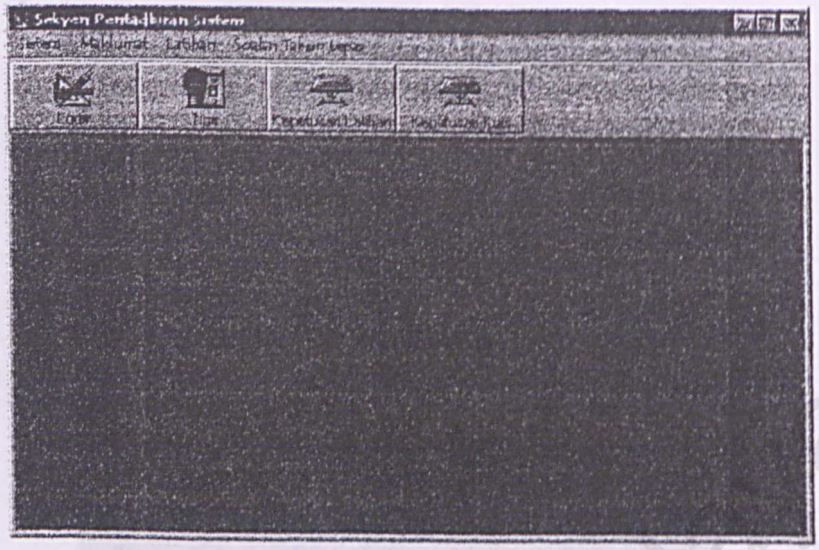

Figure 25 An Main Interface for System Administrator Section

Administrator System Section including the following modules:

3.1 Login

After login successfully, the system administrator main screen is show as below in Figure 26.

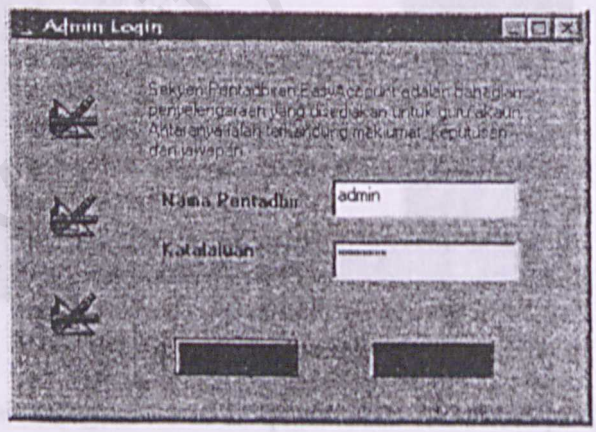

Figure 26 Login Dialog for Administrator

3.2. Sistem Menu

In this menu, you can access to *Tukar Katalaluan* sub-menu, Logout sub-menu, Tip and Exit.

1. The *Tukar Katalaluan* screen is show in Figure 27, to change your old password into new password.

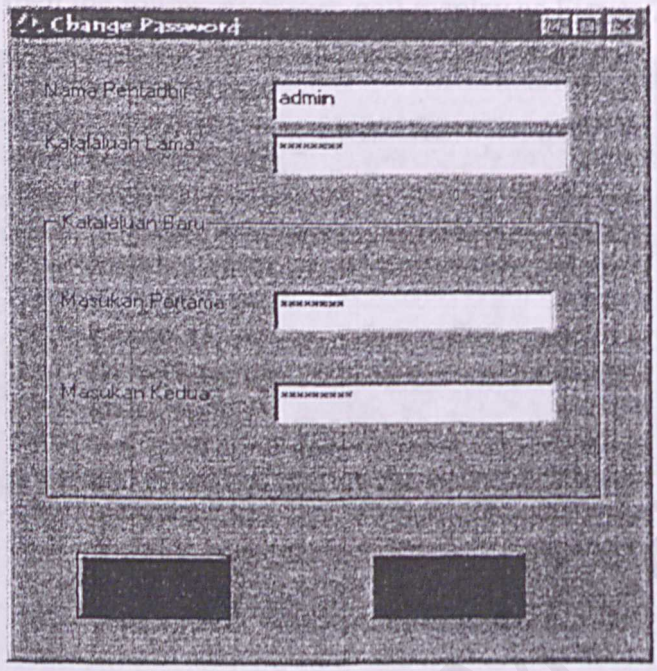

Figure 27 Change Password in System Administrator Section

2. To change password, you have to input all the blank text box together with new password.

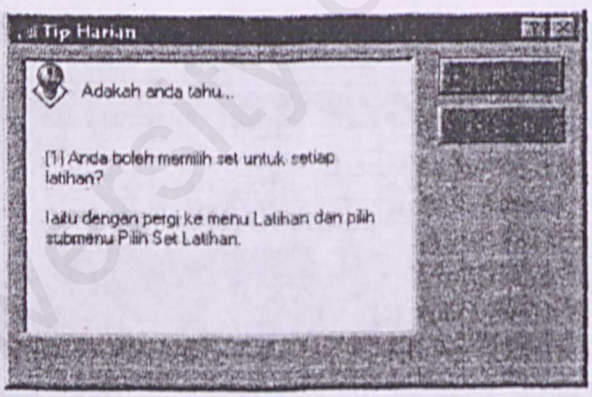

Figure 28 Tips for Administrator

3. The *Tip* screen is show in Figure 28 to help you to solve some problem.
4. If you click the Exit button, then you will terminate the SPM Question Section.

3.3 Maklumat

1. In this menu, you can access to Pelajar sub-menu and Pentadbir sub-menu. If you select the Pelajar menu, then the following screen will display as Figure 29.

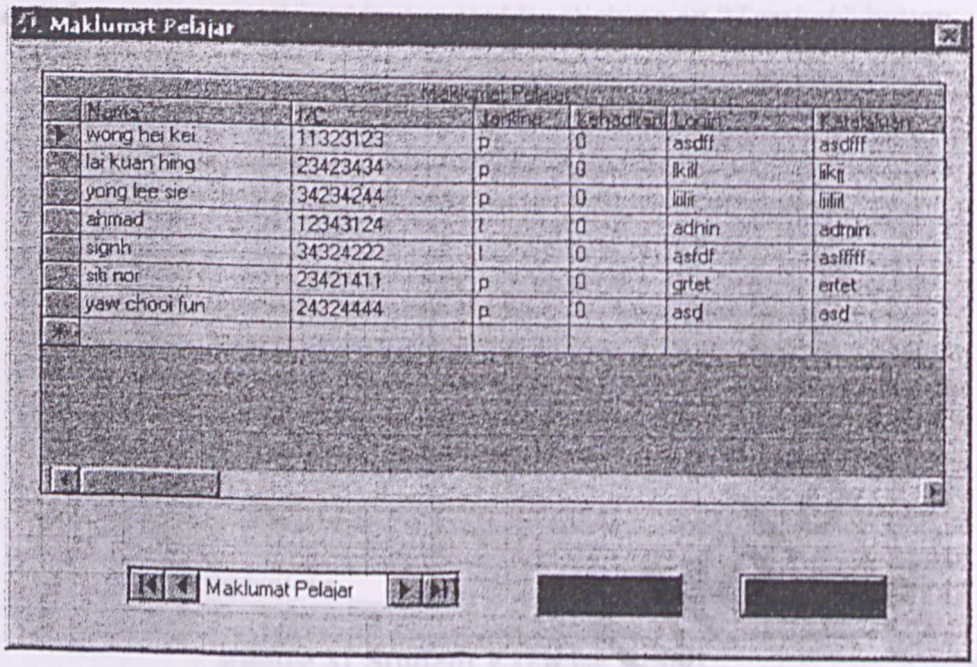

Figure 29 Student Details in Information sub menu

2. Same as the Pelajar function, the screen for Pentadbir is show in Figure 30

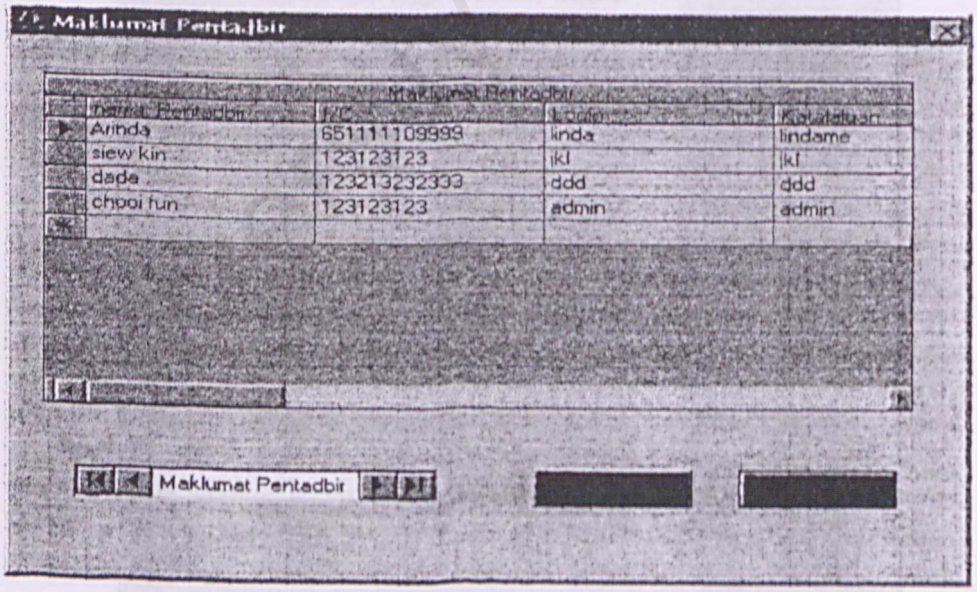

Figure 30 Administrator Details in Information sub menu

3. Click "*Tambah*" on the screen to add record.

3.4 Latihan

1. There have three types of sub-menu which are *"Keputusan"*, *"Pilih Set Latihan"*, and *Soalan dan Jawapan"* are shown in Figure 31, Figure 32 and Figure 33 respectively.
2. In *Keputusan* form, you can add student record by clicking on "*Tambah*" button.

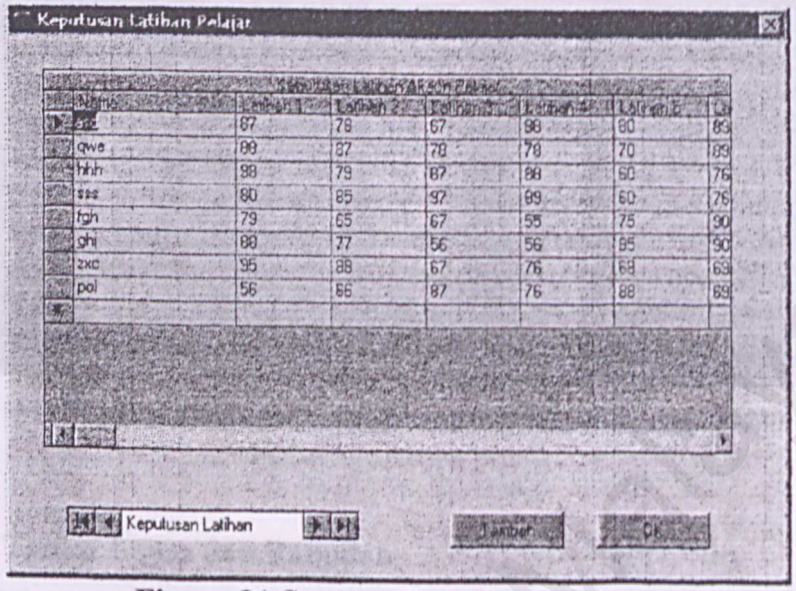

Figure 31 Student Exercise Result

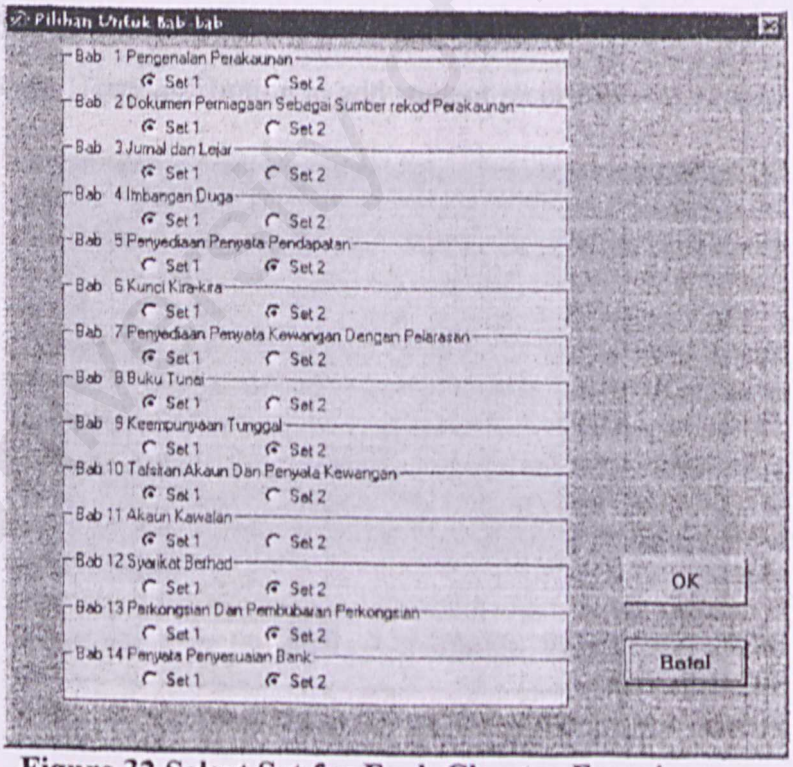

Figure 32 Select Set for Each Chapter Exercise

3. In *Keputusan* form, you can exit after view the student record by clicking on "*OK*" button.
4. In *Set Latihan* form, you can select set for each chapter by clicking on *Set 1* or *Set 2*.
5. After select, click "*OK*" button to exit the program.

6. If you select "*Soalan dan Jawapan*", then you can select either double on the left of the "*Bab 1*" until "*Bab 14*"

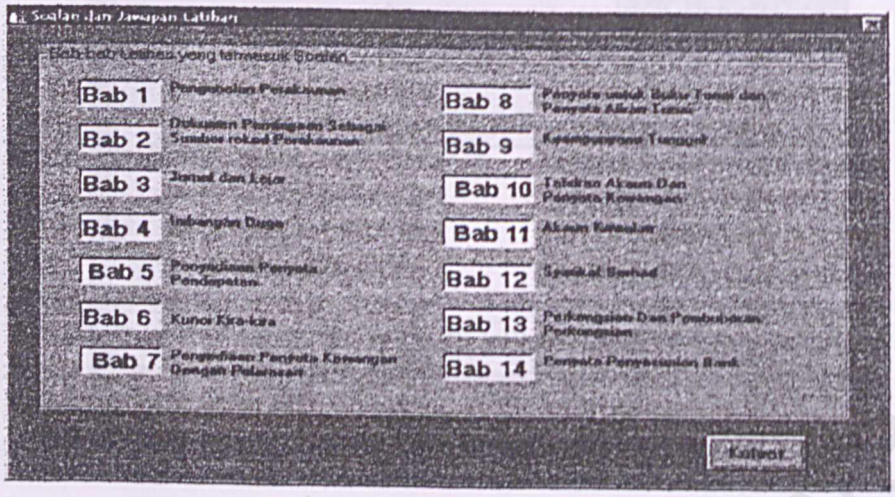

Figure 33 Question and Answer for Exercise

3.5 Soalan Tahun Lepas dan Ramalan

1. There are "*Keputusan*" sub-menu and "*Set Ramalan*" sub-menu shown in Figure 34 and Figure 35 as below.
2. You can click on "*Tambah*" button to add student record.

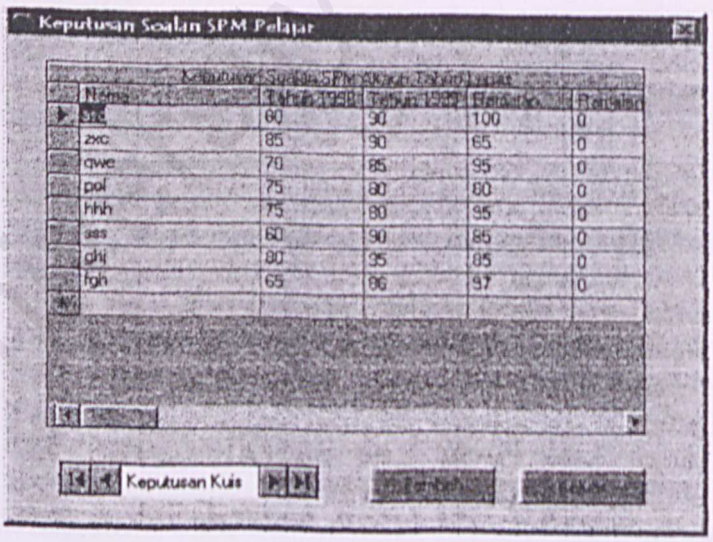

Figure 34 SPM Question Result for Student

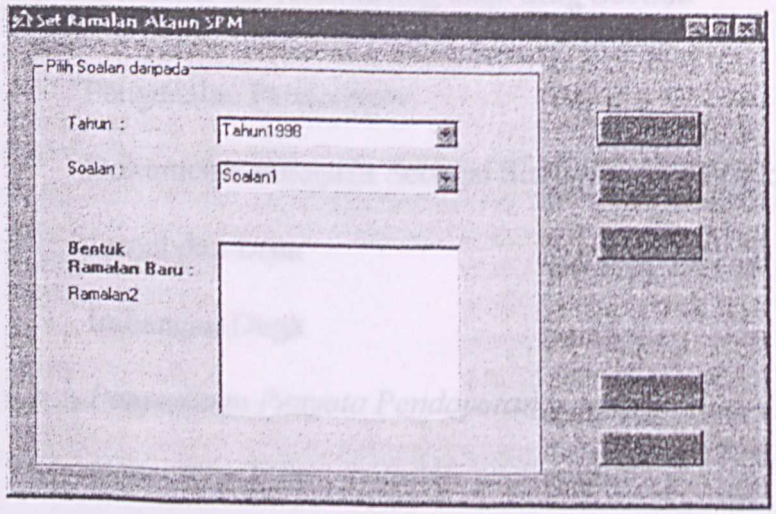

Figure 35 Setting the New Forecast Question

3. You also can click on combo box *Tahun* to select the year question, and click on the *Soalan* to select the question for the year, then click on "*Tambah*" to add the forecast question..
4. If you want to clear all question list, you can click on "*Jelaskan*" button.
5. If you want to remove the highlighted question list, you can click on "*Pindah*" button.
6. Click "*Batal*" to exit the program.

Appendix B : List of Lesson Contents for Accounting Learning Section

Bab 1 : Pengenalan Perakaunan

Bab 2 : Dokumen Perniagaan Sebagai Sumber rekod Perakaunan

Bab 3 : Jurnal dan Lejar

Bab 4 : Imbangan Duga

Bab 5 : Penyediaan Penyata Pendapatan

Bab 6 : Kunci Kira-kira

Bab 7 : Penyediaan Penyata Kewangan Dengan Pelarasan

Bab 8 : Penyata untuk Buku Tunai dan Penyata Aliran Tunai

Bab 9 : Keempunyaan Tunggal

Bab 10 : Tafsiran Akaun Dan Penyata Kewangan

Bab 11 : Akaun Kawalan

Bab 12 : Syarikat Berhad

Bab 13 : Perkongsian Dan Pembubaran Perkongsian

Bab 14 : Penyata Penyesuaian Bank

*Italic font is indicated my part to prepare the lesson, exercise question and answer, and note.

Appendix C : Glossary

Graphical User Interface (GUI)

A program interface that uses a computer's graphics capabilities to make the program easier to use. Graphical interfaces use a pointing device to select objects, including icons, menus, text boxes, etc. A GUI includes standard formats for representing text and graphics.

Prototyping

A strategy in system development in which a scaled down system or portion of a system is constructed in a short time, tested, and improved in several iterations. A prototype is an initial version of a system that is quickly developed to test the effectiveness of the overall design being used to solve a particular problem. Prototyping is similar to the Evolutionary (Iterative) Design Process. It is sometimes termed rapid prototyping and is similar to rapid application development (RAD).

SQL

For most relational database software, the query language is Structured Query Language (SQL). It is a so-called fourth-generation language (4GL). The Relational Management System (RDBMS) uses SQL to translate the user query into the technique code required to retrieve the requested data.

ADODB

By using ADO, we can simply use the OLE DB provider for the specific data source and voila to connect. We still employ the OLE DB provider for ODBC to use ADO for communicating with any ODBC source. So using ADO, we get everything we got with DAO, and more. And, it is actually easier to use.

Appendix D : Terminology and Acronyms

AIS	Accounting Information System
ADODB	ActiveX Data Object Data Base
ADODC	ActiveX Data Object Data Control
CAL	Computer Aided Learning
CBIS	Computer Base Information System
DBAs	Data Base Administrators
DBMS	Data Base Management System
DLL	Dynamic Link Libraries
DSN	Data Source Name
HTTP	Hyper Text Transfer Protocol
IDE	Integrated Development Environment
Java	An object-oriented language for the web
MB	Mega Byte
OLE	Object Link Embedded
ODBM	Object Data Base Management
RAM	Random Access Memory
ROM	Read Only Memory
SPM	Sijil Peperiksaan Menengah
SQL	Structured Query Language
XML	eXtra Markup Language
WWW	Wild Wide Web

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